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CONTAMINATION ASSESSMENT REPORT PLAN FOR 18 PETROLEUM CONTAMINATED
SITES NAS PENSACOLA FL
11/1/1991
ABB ENVIRONMENTAL SERVICES, INC

CONTAMINATION ASSESSMENT PLAN
18 PETROLEUM CONTAMINATED SITES

**NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

CTO NO.: 008

Contract Number N62467-89-D-0317

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1.0 INTRODUCTION

On September 6, 1991, ABB Environmental Services Inc. (ABB-ES) contracted with Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to prepare a Contamination Assessment Plan (CAP) for 18 petroleum contaminated sites located at the Naval Aviation Depot (NADEP) in Pensacola, Escambia County, Florida. This CAP outlines the field investigation and sampling program to assess the source(s) and extent of contamination at each site. The CAP presents site locations, summarizes previous investigations, and describes the rationale for the proposed field investigation to be implemented during the assessment.

2.0 BACKGROUND

2.1 GENERAL SITE DESCRIPTION AND PURPOSE OF INVESTIGATION. In 1987, the Naval Air Rework Facility (NARF) in Pensacola, Florida, was renamed the Naval Aviation Depot (NADEP). NADEP Pensacola, Florida, formerly the operations and repair department of the Naval Air Station (NAS) Pensacola, is now a tenant command located on NAS facilities within the Pensacola Naval Base Complex. The Pensacola Naval Base Complex is located on the western edge of Pensacola Bay approximately 2 miles south of Pensacola on Navy Road (State Route 295). NADEP Pensacola occupies approximately 130 acres of land (Figure 2-1). The mission of NADEP is to maintain and operate facilities for, and perform a complete range of depot-level rework operations on, designated weapons systems, accessories, and equipment; manufacture parts and assemblies, as required; provide engineering services in hardware design; furnish technical services on aircraft maintenance and logistic problems; and perform other levels of aircraft maintenance.

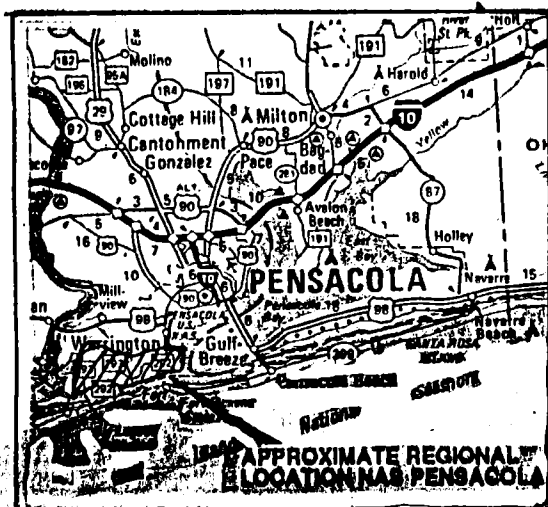
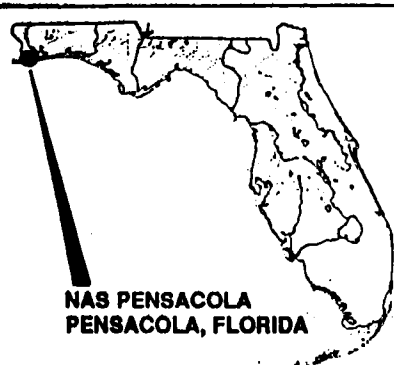
During a tank removal program implemented by the Navy in 1989 and 1990, underground petroleum storage tanks at various site locations were removed. In many cases, these tanks were replaced with new tanks. Tank contents varied from site to site, but generally were restricted to petroleum products such as waste oil, diesel fuel, unleaded gasoline, and PD680 (a solvent similar to mineral spirits). The reported volumes of the tanks varied from 500 to 3,000 gallons. During tank removal activities, two soil samples were collected from the bottom of each tank excavation and composited. Samples were sent to a laboratory and analyzed for total recoverable petroleum hydrocarbons (TRPH). Based on the TRPH analyses, 18 sites were identified for contamination assessment investigations. Soil and groundwater contamination at the sites will be assessed pursuant to the Florida Department of Environmental Regulation (FDER), Chapter 17-770, Florida Administrative Code (FAC).

2.2 INDIVIDUAL SITE DESIGNATIONS, SITE DESCRIPTIONS, AND SITE HISTORIES. Figure 2-2 is a general site configuration map showing the relative locations of the sites. Each site has been assigned a numerical designation that corresponds to the building number in close proximity to the site. Each designation has been suffixed indicating the directional side of the building where the site is located. For instance, site 604-S indicates that the site is located on the southerly side of Building 604. Table 2-1 gives individual site designations, general locations, site elevations, number of tanks, tank installation and replacement records, tank volumes, reported tank contents, and reported TRPH concentrations found by the Navy at each site.

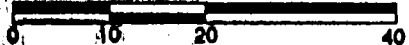
Brief site descriptions, site histories, and detailed site maps are given in Section 5.0. Individual site maps show proposed soil boring and monitoring well locations, which are discussed in Section 4.1.

2.3 HYDROGEOLOGY

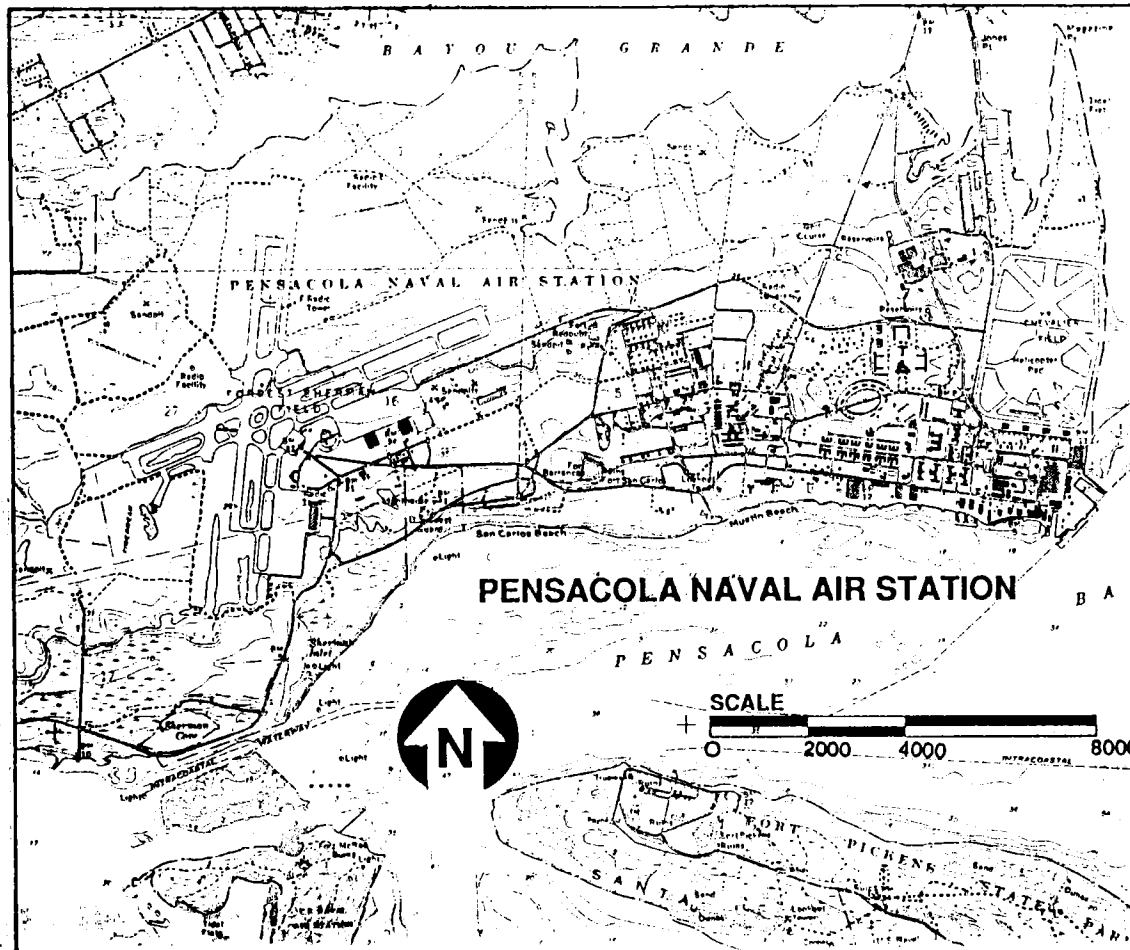
2.3.1 Local and Regional Hydrogeology NADEP Pensacola is underlain by three water bearing zones. These zones include the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer.



SCALE MILES



SOURCE: MAP OF FLORIDA
AMERICAN AUTOMOBILE ASSOCIATION
FALLS CHURCH, VA 1990



SOURCE: USGS QUADRANGLE FORT BARRANCAS, FLA, 1970

**FIGURE 1
FACILITY LOCATION MAP**



**CONTAMINATION
ASSESSMENT PLAN**

**NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

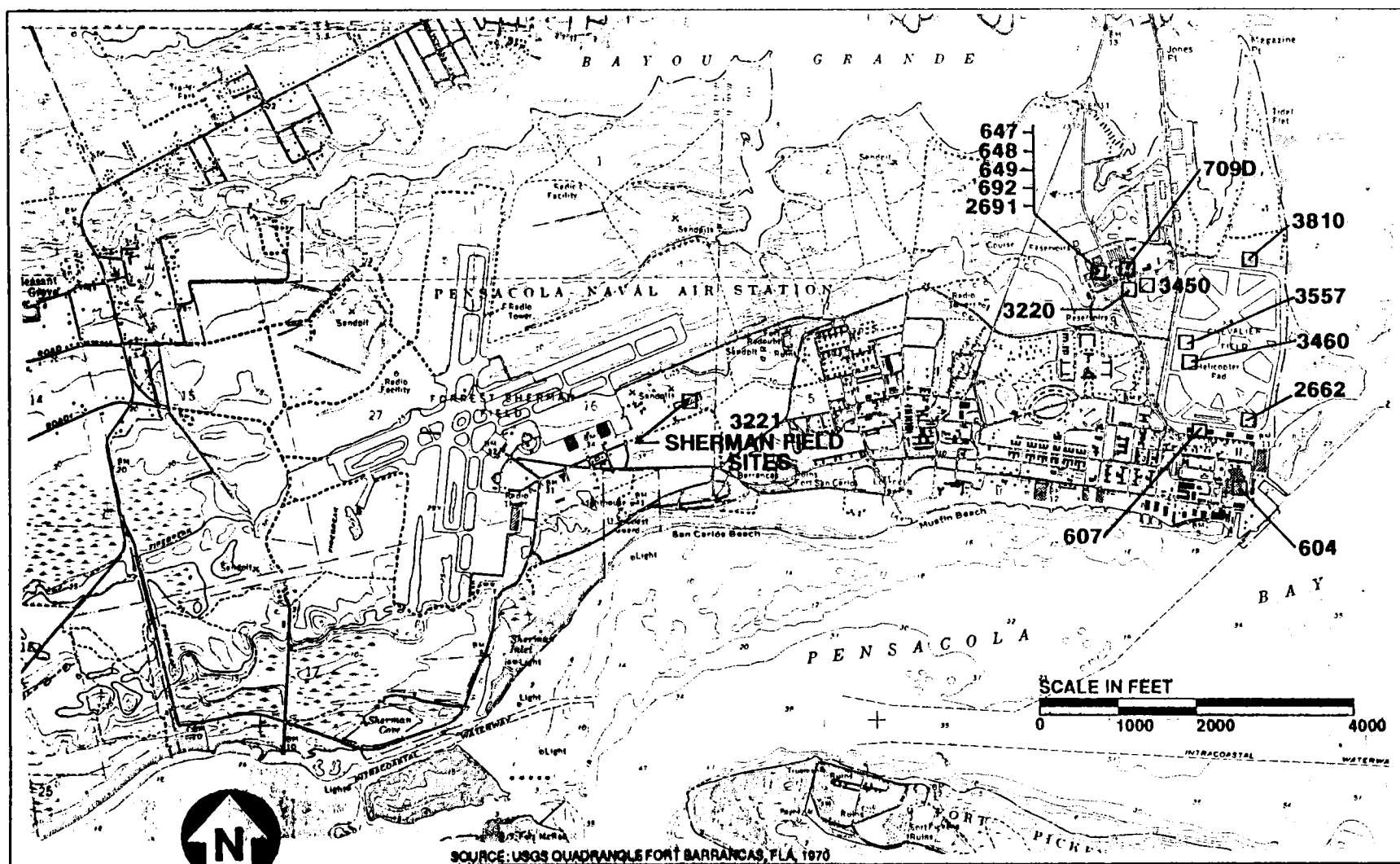


FIGURE 2

LOCATIONS OF SITES

SOURCE: USGS QUADRANGLE FORT BARRANCAS, FLA. 1970



CONTAMINATION ASSESSMENT PLAN

**NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

**TABLE 2-1
SITE DESIGNATION
AND
TANK INFORMATION**

Site designation	Location	Elev. (ft)	No. of tanks	Date installed	Tank(s) replaced?	Volume (gallons)	Contents	TRPH (ppm)
604-2	Rockwell & South Ave.	5	1	1980	No	500	PD680	5,800
607-NE	Saufley Field	5	27	1980	Yes	500	Waste oil/aviation fuel	190
647-N	Golf Course	29	1	1950	No	Unknown	Waste oil	180
648-N	Golf Course	29	27	1950	Yes	1,000	Waste oil	2,400
649-N	Golf Course	26	1	1965	Yes	500	Waste oil/solvent	120
649-W	Golf Course	26	1	1978	No	1,000	Waste oil/PD-680	770
692-N	Golf Course	30	3	1950	yes	500	Waste oil/PD-680	880-4,000
709D-N	Chevalier Field	27	1	1940	No	3,000	Waste oil/PD-680	250
2662-W	SE Chevalier Field	5	1	1983	Yes	1,000	JP-5	2,100
3221-NW	Sherman Field	30	1	1967	No	500	JP-5 waste	530
3221-NE	Sherman Field	30	1	1967	No	500	Waste oil/JP-5	1,900
3221-SW	Sherman Field	32	2	1967	Yes	Unknown	PD-680/detergent	39-57
3220-S	W Chevalier Field	26	1	1970	No	Unknown	Waste oil	2,900
3220-E	W Chevalier Field	26	1	1970	Yes	500	Diesel fuel	18,000
3450-W	NW Chevalier Field	25	6	1971	Yes*	Unknown	Waste oil/PD-680	80-330
3450-S	NW Chevalier Field	25	1	1971	Yes	1,000	Unleaded gasoline	2,700
3557-S	W Chevalier Field	5	2	1982	Yes	Unknown	Waste oil	140-160
3810-N	N Chevalier Field	5	1	1982	yes	500	Fuel oil	1,600

Notes:

Elev. = elevation.

TRPH = total recoverable petroleum hydrocarbons.

ft = feet.

ppm = parts per million

? = possibly additional tanks present.

* = 3 PD-680 tanks replaced; 3 waste oil tanks not replaced.

The sand-and-gravel aquifer is comprised of Pleistocene terrace deposits, the Pleistocene Citronelle Formation (Marsh, 1966), and Miocene coarse clastics. These deposits extend from the surface to a depth of approximately 400 feet below land surface (bls) and are predominantly poorly sorted fine-grained to coarse-grained sands interbedded with numerous layers of clay and gravel (up to 60 feet thick). There is a great lithologic variability in these deposits. Clay lenses and the presence of hardpan layers within the sand-and-gravel aquifer result in the occurrence of perched water tables and artesian conditions in some areas (Musgrove and others, 1965). Groundwater flow is generally topographically controlled. Recharge to the aquifer is derived almost entirely from local rainfall. Virtually all groundwater usage in the area comes from the sand-and-gravel aquifer.

The Upper Floridan aquifer is comprised of deposits correlative to the lower Miocene Tampa Formation and the upper Oligocene Chickasawhay Formation. These two formations are undifferentiated in the Pensacola area. Locally, these deposits are approximately 380 feet thick (Marsh, 1966) and are typically brown to light gray, hard, fossiliferous dolomitic limestones or dolomites with a distinctive spongy-looking texture. Locally, the overlying Pensacola Clay is approximately 1,000 feet thick and forms an effective confining unit between the sand-and-gravel aquifer and the Upper Floridan aquifer (Marsh, 1966). The Upper Floridan aquifer is recharged by local rainfall in Conecuh and Monroe Counties, Alabama (Healy, 1980). General groundwater flow in the Upper Floridan aquifer is to the southeast toward the Gulf of Mexico (Barr, 1987). The groundwater in the Upper Floridan aquifer is mineralized in this area and is not used as a water supply.

The Lower Floridan aquifer is comprised of upper to middle Eocene limestone and is approximately 500 feet thick in the site vicinity (Marsh, 1966). The limestones of the Floridan aquifer are typically white to grayish cream, soft, and chalky. The Lower Floridan aquifer is confined from above by the Bucatunna Clay Member of the middle Oligocene Byram Formation and from below by gray shales and clays of middle Eocene age. The Bucatunna Clay is approximately 170 feet thick in the site vicinity (Musgrove and others, 1965). Groundwater flow in the aquifer is southeast toward the Gulf of Mexico (Healy, 1980). Water quality in the Lower Floridan aquifer is poor because of high mineralization.

2.3.2 Site-Specific Hydrogeology Based on previous investigations at NAS Pensacola, site soils are expected to consist predominantly of sand. The water table is shallow, ranging in depth from 2 feet to slightly greater than 20 feet bls depending on the site elevation. Fluctuations in depth to the water table appear to be controlled mainly by topography. Further details of site specific hydrogeologic conditions will be addressed in the forthcoming contamination assessment.

3.0 INVENTORY OF NEARBY POTABLE WELLS

ABB-ES, with the cooperation of the Environmental Coordinator at NADEP Pensacola, will conduct an inventory of identified potable wells within a 1/4-mile radius of each site. The Fort Barrancas, Florida, 7-1/2-minute U.S. Geological Survey 1970 quadrangle map will be used to show the area of investigation and the location of any existing water supply wells identified during the well inventory.

4.0 PROPOSED CONTAMINATION ASSESSMENT PLAN

The contamination assessment will be implemented as follows:

1. field investigation,
2. Contamination Assessment Report (CAR) preparation, and
3. follow-up report preparation.

4.1 FIELD INVESTIGATION. The field investigation will be implemented in two phases, Phase I and Phase II.

4.1.1 Phase I Investigation The Phase I Field investigation will include a startup meeting to be held at the site. All personnel associated with the investigation will review the scope of work presented in the CAP and the Health and Safety Plan (HASP). The Phase I Field Investigation will verify the existence of petroleum contaminants at each site, assess the degree and extent of soil contamination, and assess the direction of contaminant migration. The Phase I investigation will involve the following activities:

- soil boring installation,
- soil sample collection and analysis, and
- temporary wellpoint installation.

Soil Borings. A minimum of five soil borings will be drilled at each site. Hollow-stemmed auger drill rigs will be used to advance the boreholes to a depth sufficient to reach the water table.

Soil Sample Collection and Analysis. At each boring location, split-spoon soil samples will be collected at 5-foot intervals above the soil-groundwater interface. If possible, one sample will be collected at the soil-groundwater interface. Soils will be classified in accordance with the Unified Soil Classification System.

Soil sampling protocol will follow guidelines set forth in ABB-ES' Comprehensive Quality Assurance Plan Program (CompQAPP). The CompQAPP has been approved by FDER. Soil samples collected above the water table will be screened for volatile petroleum contamination with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). The soil screening procedure will be conducted following FDER Chapter 17-770.200(2), FAC, guidelines. Screening of soil samples will be used to assess the degree and extent of contamination and select locations for additional soil borings and Phase II monitoring wells. The number of boreholes drilled at each site during the Phase I assessment will depend on the extent of contamination indicated by soil sample screening results. Therefore, it may be necessary to drill more than five boreholes at each site during the Phase I activity.

Additional analyses will be performed on soil samples collected at sites contaminated with constituents of the waste oil group as classified in Chapter 17-770, FAC. For these sites, soil samples will be sent under chain-of-custody to an FDER-approved analytical laboratory. Soil samples will be analyzed for

parameters defined in FDER Chapter 17-770.600 (8)(c), FAC. These analyses include U.S. Environmental Protection Agency (USEPA) Methods 418.1, 624, and 625 for petroleum hydrocarbons, volatile, semivolatile and base-neutral-acid extractable compounds; arsenic; cadmium; chromium; and lead.

Temporary Wellpoint Installation. Temporary polyvinyl chloride (PVC) wellpoints will be placed in three of the soil borings at each site. The locations of the wellpoints will be decided in the field by the ABB-ES geologist. Groundwater levels will be measured in each wellpoint to estimate groundwater flow direction and gradient. The site-specific groundwater flow direction and gradient data will be used to select Phase II monitoring well locations.

4.1.2 Phase II Investigation The Phase II field investigation will be conducted after completion and review of the Phase I investigation. Phase II activities will include the following:

- monitoring well installation and development,
- groundwater sample collection and analyses,
- aquifer testing in selected wells,
- well surveying, and
- waste disposal.

The Phase II investigation will identify and quantify soil and groundwater contaminants at each site, assess the vertical and horizontal extent of soil and groundwater contamination, estimate the direction and rate of contaminant migration in groundwater, and use these findings to recommend a course of action that will comply with FDER rehabilitation levels.

Monitoring Well Locations. Information obtained from the Phase I investigation and Phase II field screening activities will be used to estimate the appropriate locations of monitoring wells to be installed at each site. For sites reported to have TRPH concentrations less than 1,000 parts per million (ppm) in soil samples (Table 2-1), a minimum of seven monitoring wells will be installed. Six of these wells will be shallow wells, and one well will be a deeper well. The actual number and location of monitoring wells may be subject to change depending on the extent and magnitude of the contaminant plume.

The total depth and screened interval of the wells will depend on depth to groundwater. It is anticipated that the shallow wells will be installed to an approximate depth of 15 to 30 feet bls and the deep well will be approximately 30 to 50 feet bls.

Groundwater samples from the shallow wells will be used to assess the horizontal extent of groundwater contamination. Based on the results of the Phase I soil boring screening, one or two shallow wells will be installed in the area of highest suspected contamination. One well will be upgradient of the area of highest suspected contamination, and three to four wells will be downgradient of the area. The deeper well will be installed in the area of suspected highest contamination to assess the vertical extent of contamination or inside the downgradient edge of the contaminant plume.

For sites with reported TRPH soil concentrations greater than or equal to 1,000 ppm (Table 2-1), three additional shallow wells will be installed at the site. The placement of these wells will be aided by field GC screening of soil samples. The additional wells will be located to assess the vertical and horizontal extent as well as the degree of contamination at the site.

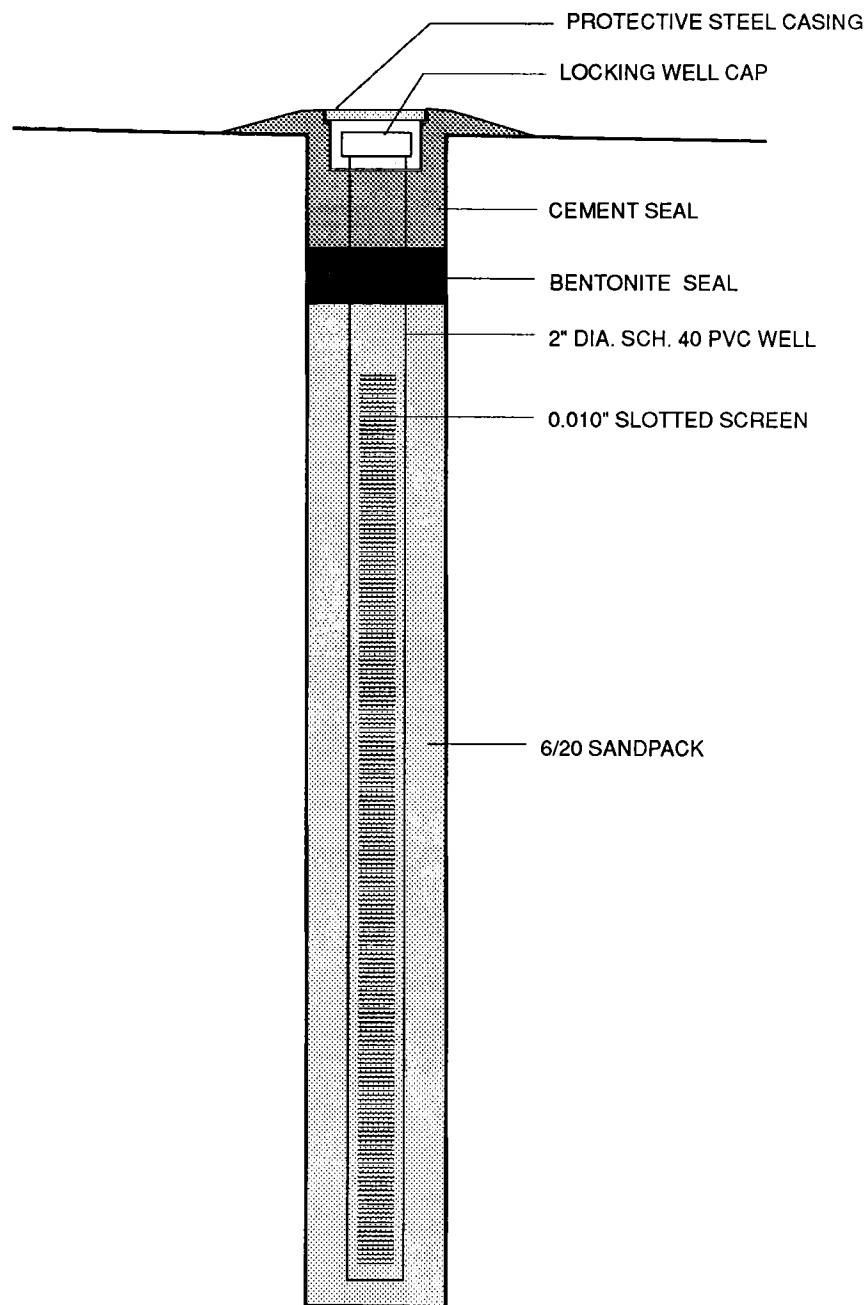
Monitoring Well Installation and Development. Wells will be constructed of 2-inch inside diameter (ID), schedule 40, flush-threaded, PVC screen and riser pipe. The screen interval will be 10 feet with a slotted screen opening of 0.010 inch (or appropriate alternative). Approximately 2 feet of screen will be installed above the water table to accommodate seasonal fluctuations of the water table. The borehole around the screen will be filled with a quartz sand filter pack of 6/20 size (or appropriate alternative) to approximately 1 foot above the top of the screen. A nominal 1 foot bentonite seal will be placed above the filter pack. The remaining well annulus will be grouted with a 5 percent bentonite and Portland cement mixture. A locking, watertight cap will be installed on each well. The monitoring wells will be finished below grade in a subsurface vault and protected with a metal manhole assembly and traffic-bearing cover. A diagram of a typical monitoring well is illustrated in Figure 4-1. All newly completed monitoring wells will be developed by pumping or bailing until the development water is free of suspended sediments or the ABB-ES onsite geologist is satisfied that an adequate hydraulic connection has been made with the surrounding aquifer.

Detailed information of monitoring well construction, lithologic descriptions, split-spoon samples, and other pertinent data will be graphically displayed in boring logs. Total depths and screened intervals will be presented in tabular form. These data will be included in a Contamination Assessment Report (CAR).

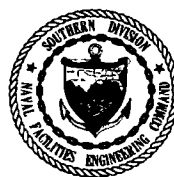
Groundwater Sample Collection and Analyses. Groundwater samples will be collected from monitoring wells in which no free-floating petroleum product has been observed. Groundwater samples will be collected with Teflon™ bailers. Sampling protocol will comply with the ABB-ES CompQAPP. The appropriate number of quality control samples (field blanks, trip blanks, equipment blanks, and duplicates) will be calculated during the Phase II assessment.

Groundwater samples will be shipped under chain-of-custody to a FDER-approved analytical laboratory. Samples will be analyzed for parameters required by FDER Chapter 17-770, FAC. The type of analyses performed on samples collected at a given site during Phase II will depend on the type of petroleum contamination detected during the Phase I assessment.

For sites contaminated with petroleum products classified in the kerosene analytical group, all groundwater samples will be analyzed for petroleum hydrocarbons (USEPA Methods 418.1, 602, and 610), purgeable aromatics, and polynuclear aromatic hydrocarbons. Representative samples and samples collected from highly contaminated areas will also be analyzed for purgable hydrocarbons (USEPA Method 601), ethylene dibromide (EDB), and lead.



**FIGURE 4-1
MONITORING WELL
CONSTRUCTION DIAGRAM**



**CONTAMINATION
ASSESSMENT PLAN**

**NAVAL AVIATION DEPOT
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For sites contaminated with petroleum products solely classified in the gasoline analytical group, all groundwater samples will be analyzed for USEPA Method 602. Representative samples and samples collected from highly contaminated areas will also be analyzed for USEPA Method 601, EDB, and lead.

For sites contaminated with waste oil or unknown contaminants, all groundwater samples will be analyzed for petroleum hydrocarbons, volatile, semivolatile, and base-neutral- acid extractable compounds using USEPA Methods 418.1, 624, 625, and the metals arsenic, cadmium, chromium, and lead.

Aquifer Tests. Aquifer tests will be conducted to estimate the hydraulic properties of the water table aquifer at contaminated sites. Rising head slug tests will be performed on a minimum of three wells at each site to collect data for estimating hydraulic conductivities of the aquifer.

Well Surveying. A Florida-licensed professional surveyor will be contracted to survey the horizontal and vertical coordinates for each of the monitoring wells relative to either the U.S. Geological Survey (USGS) North American Datum (NAD) 1927 or base coordinate grid system. A measuring point for groundwater elevation will be established at the north edge of the top-of-casing of each well.

Waste Disposal. During the field investigation, ABB-ES personnel and their subcontractors will coordinate efforts with site personnel to dispose of contaminated fluids and soils resulting from site assessment activities. ABB-ES and their subcontractors will supply Department of Transportation (DOT) 17-C open-top, 55-gallon drums and will dispose of contaminated soils, water, and miscellaneous materials (gloves, booties, etc.) into these drums and store them onsite. It will be the responsibility of the Navy to dispose of hazardous waste.

4.2 PREPARATION OF REPORTS

4.2.1 Contamination Assessment Reports (CARs) Upon completion of the Phase II field investigations and receipt of the laboratory analytical results of the groundwater samples, draft (90 percent), draft final (100 percent), and final CARs for each site will be prepared and submitted to SOUTHNAVFACENGCOM and NAS Pensacola for review and approval. The reports will discuss site background information, site conditions, findings, and recommendations for each site pursuant to FDER Chapter 17-770.630(1) FAC. Recommendations shall be made regarding the need for any followup reports. Site location maps, locations of soil borings and monitoring wells, piezometric surface maps, and contamination delineation maps (if applicable) will be included with the reports. Upon completion of the draft CARs, a meeting will be held to incorporate SOUTHNAVFACENGCOM comments in the reports.

4.2.2 Followup Reports The type of followup reports to be prepared will be contingent on the degree and extent of contamination found at the specific site. Recommendations for the type of action to be taken at each site will be based upon the findings and conclusions of the final CAR for that particular site. The CAR will recommend one of the following:

- no further action proposal (NFAP),
- monitoring only plan (MOP),
- remedial action Plan (RAP), or
- risk assessment, followed by a MOP or RAP.

NFAP. If a NFAP is accepted by FDER, no followup reports will be necessary.

MOP. If a MOP is accepted by FDER, periodic draft-final (100 percent) and final followup reports will be prepared as needed.

RAP. If remediation is required at a site, a RAP will be developed. The RAP will include the following items:

- summary sheet of the CAR,
- general discussion of the technical and economic feasibility of the selected remedial system and why it was chosen over other remedial options;
- general discussion of the rationale for the selected system;
- comparison of contaminant concentrations detected at the site with existing State and USEPA cleanup criteria in table format;
- disposition and expected contamination concentrations of any effluent from the proposed cleanup method;
- cost estimates and schedules for the design, construction and operation phases;
- designation of monitoring wells and proposed methodology for verifying accomplishment of RAP goals (cleanup criteria);
- general discussion of the treatment of contaminated soils; and
- recommendations for conducting pilot studies and obtaining additional information.

The RAP will compare a maximum of four technologies for remediation of soil and/or groundwater. The technology selected will be based on its technical merit, economic feasibility, and applicability to site-specific conditions. A conceptual design and rationale for the design will be provided for the most feasible remedial technology.

It is the understanding of ABB-ES that SOUTHNAVFACENGCOM will develop performance specifications for the selected site remediation measures. Additional site information that may be needed to develop the performance specifications are:

- present and future site usage,
- locations of existing utilities, and
- location and availability of electricity.

Risk Assessment. For sites where rehabilitation to pristine or state rehabilitation levels is not considered to be realistic, a risk assessment may be prepared. According to FDER (1990), a Risk Assessment is a:

"scientific and technical evaluation of the risks to the public health, the environment and the public welfare posed by the type and levels of contaminants at a site. The Risk Assessment is composed of:

"an exposure assessment which identifies actual and potential routes by which receptors may be exposed to the contaminants, and determines contaminant levels to which receptors may be exposed;

"a toxicity assessment which defines the applicable health and environmental criteria for contaminants found at the site for all the potential or actual exposure routes identified in the exposure assessment; and

"the risk characterization which utilizes the results of the exposure assessment and the toxicity assessment to characterize cumulative risks to the affected population and the environment from contaminants found at the site."

5.0 PROPOSED SCOPE OF WORK, INDIVIDUAL SITE DESCRIPTIONS, SITE MAPS, AND PROPOSED SOIL BORING AND MONITORING WELL LOCATIONS

Individual site descriptions and site maps are presented in this section. Site maps show proposed soil boring and monitoring well locations at each site (Figures 5-1 through 5-18). Table 5-1 categorizes the scope of work anticipated to be performed at each site. The work scope for a given site may be altered depending on the findings of the Phase I and Phase II contamination assessments.

5.1 SITE 604-S. Building 604 is located approximately 500 feet west of Pensacola Bay at the northeast corner of the intersection of Rockwell Avenue and South Avenue. Site 604-S is the former location of a 500-gallon PD680 storage tank. The tank was installed in 1980 and was not replaced. TRPH concentrations in the soil were reported to be 5,800 ppm. Much of the contamination at this site is reportedly from unrelated surface releases rather than tank leakage.

5.2 SITE 607-NE. Building 607 is located along the southern edge of Chevalier Field approximately 800 feet west of Pensacola Bay along Saufley Street. Site 607-NE is the location of a 500-gallon, double-walled steel tank used for storage of waste oil and waste aviation fuel. The existing tank was installed during the tank removal and replacement program conducted during 1989 and 1990. The old tank was installed in 1980. TRPH soil concentrations were reported to be 190 ppm. Another tank of unknown contents is reportedly located at the site.

5.3 SITE 647-N. Building 647 is located between Murray Road and the golf course on the west side of Chevalier Field. Site 647-N formerly contained a waste oil storage tank of unknown volume. The tank was installed in 1950 and was not replaced. Only the top and sides of the tank were removed. The former tank area is located in a courtyard between Buildings 647 and 3815. TRPH soil concentrations were reported to be 180 ppm.

5.4 SITE 648-N. Building 648 is located between Murray Road and the golf course on the west side of Chevalier Field. Site 648-N formerly contained a 1,000-gallon waste oil and hydraulic fluid storage tank. The tank was originally installed in 1950 and later replaced. TRPH soil concentrations were reported to be 2,400 ppm. Another 1,000-gallon tank used to store solvents is reported to be at this site.

5.5 SITE 649-N. Building 649 is located between Murray Road and the golf course on the west side of Chevalier Field. Site 649-N contained a 500-gallon tank used for mixed storage of solvent and waste oil. The tank was installed in 1965 and replaced with an aboveground tank. TRPH soil concentrations were reported to be 120 ppm.

5.6 SITE 649-W. Building 649 is located between Murray Road and the golf course on the west side of Chevalier Field. Site 649-W formerly contained a 1,000-gallon tank used for mixed storage of PD680 and waste oil. The tank was installed in 1978 and was not replaced. TRPH soil concentrations were reported to be 770 ppm.

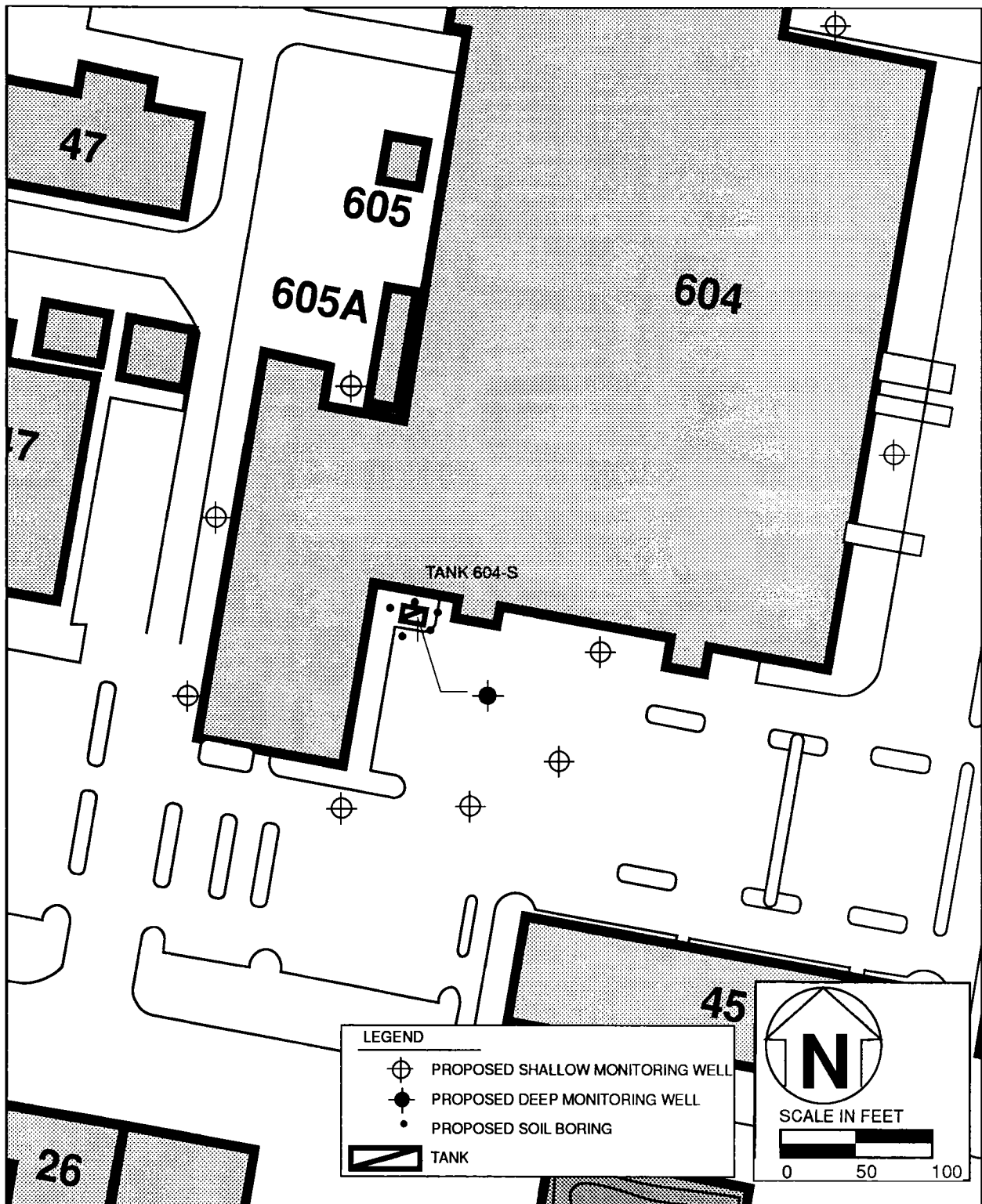
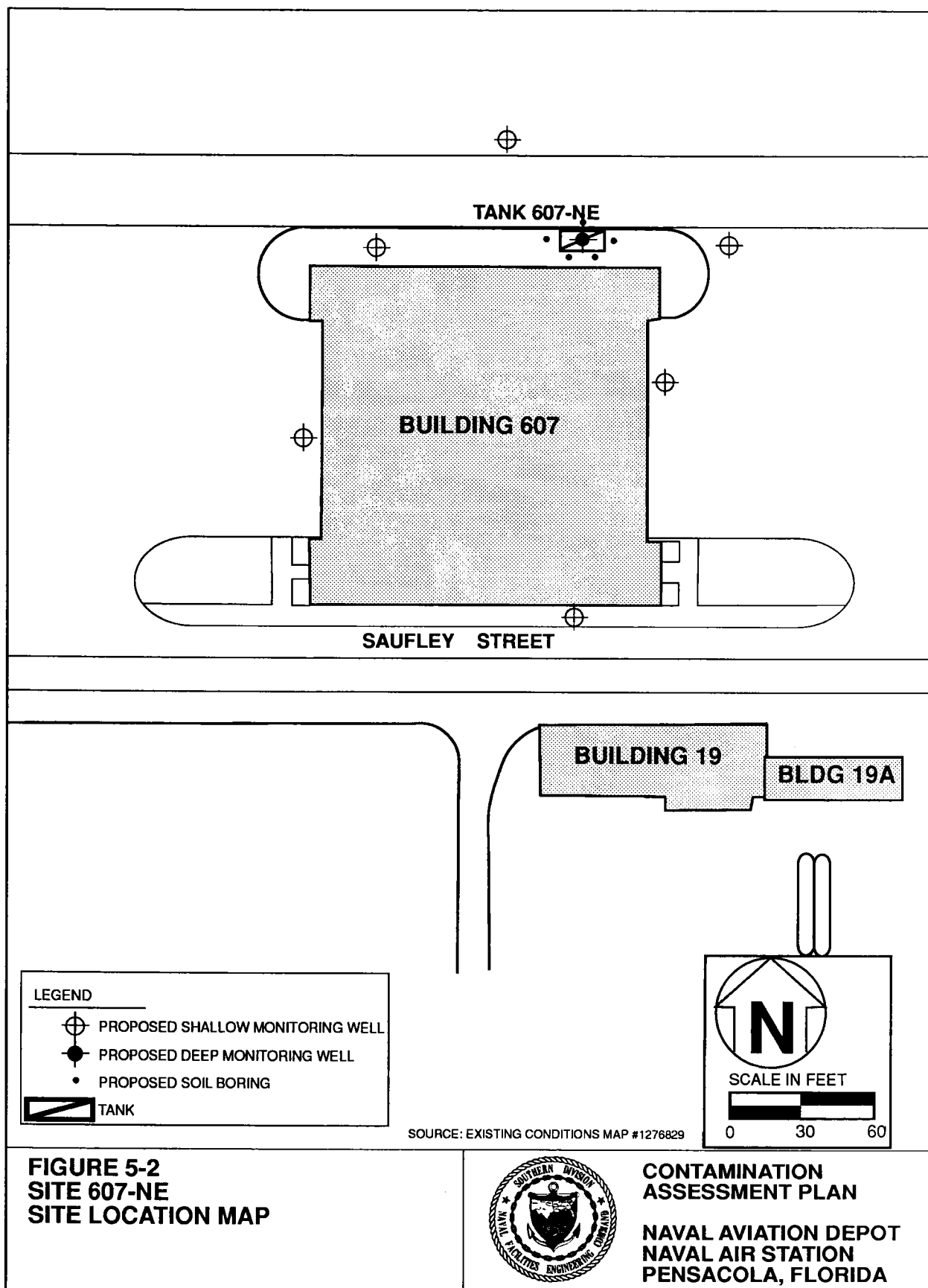


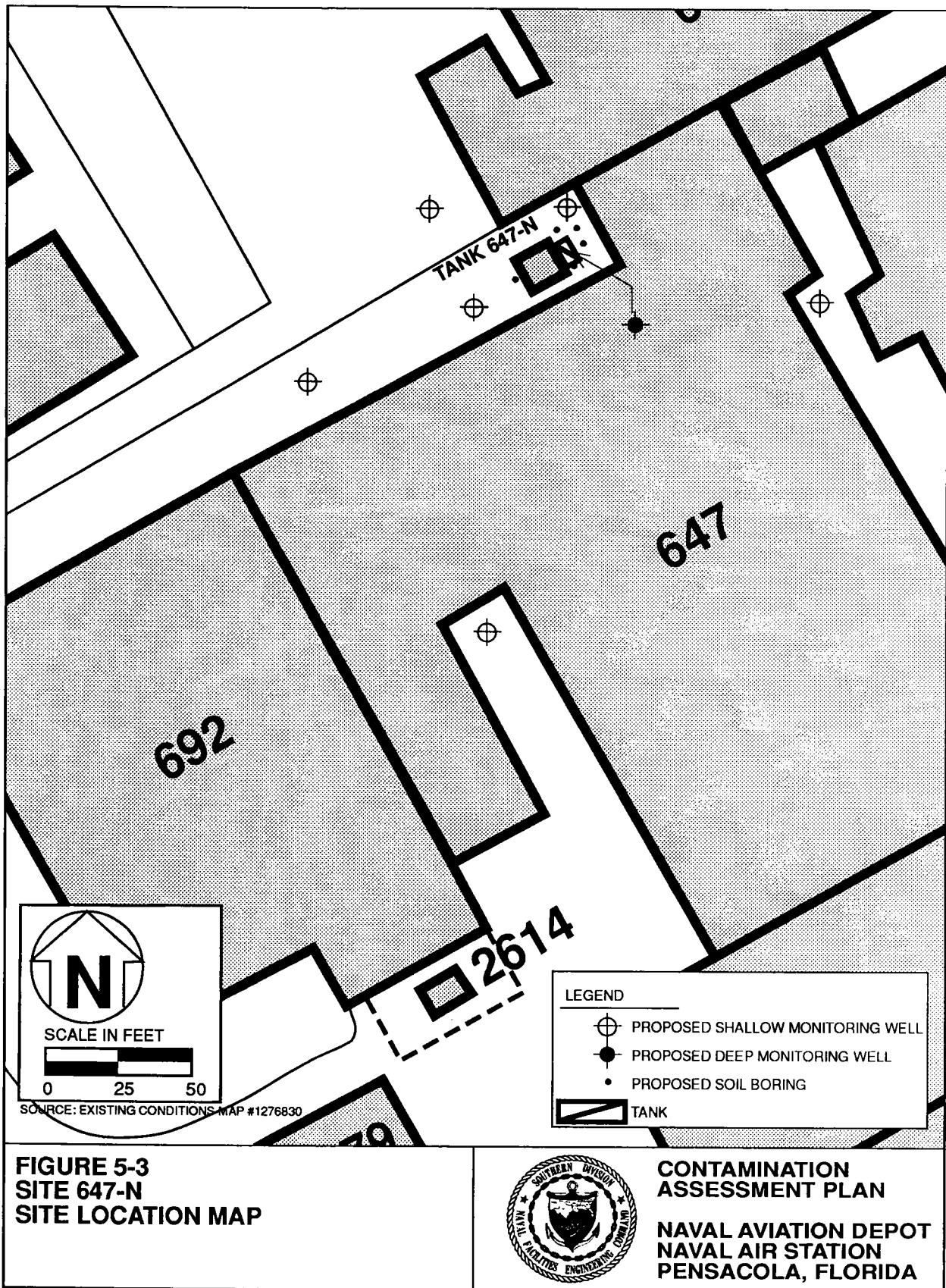
FIGURE 5-1
SITE 604-S
SITE LOCATION MAP

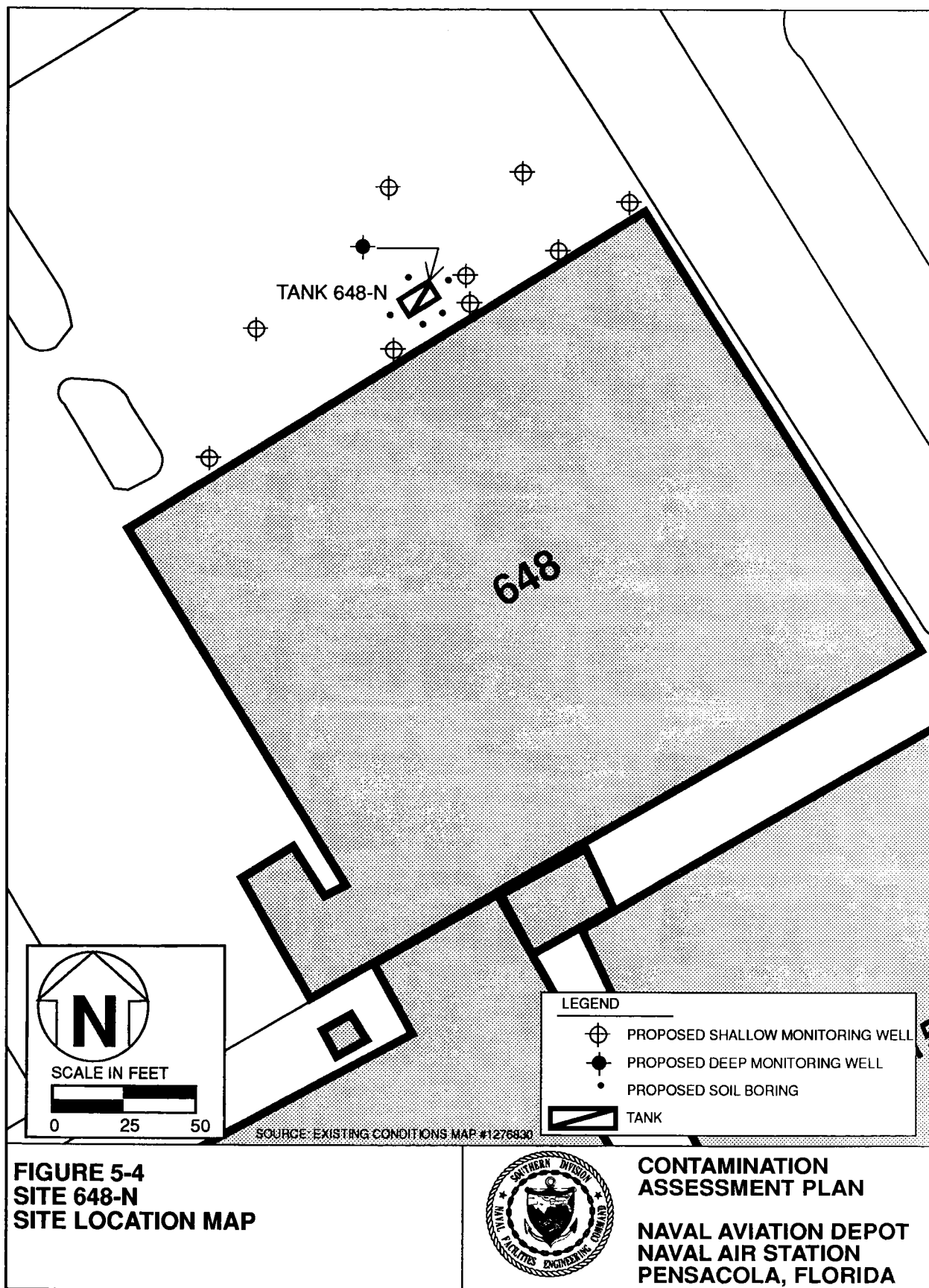


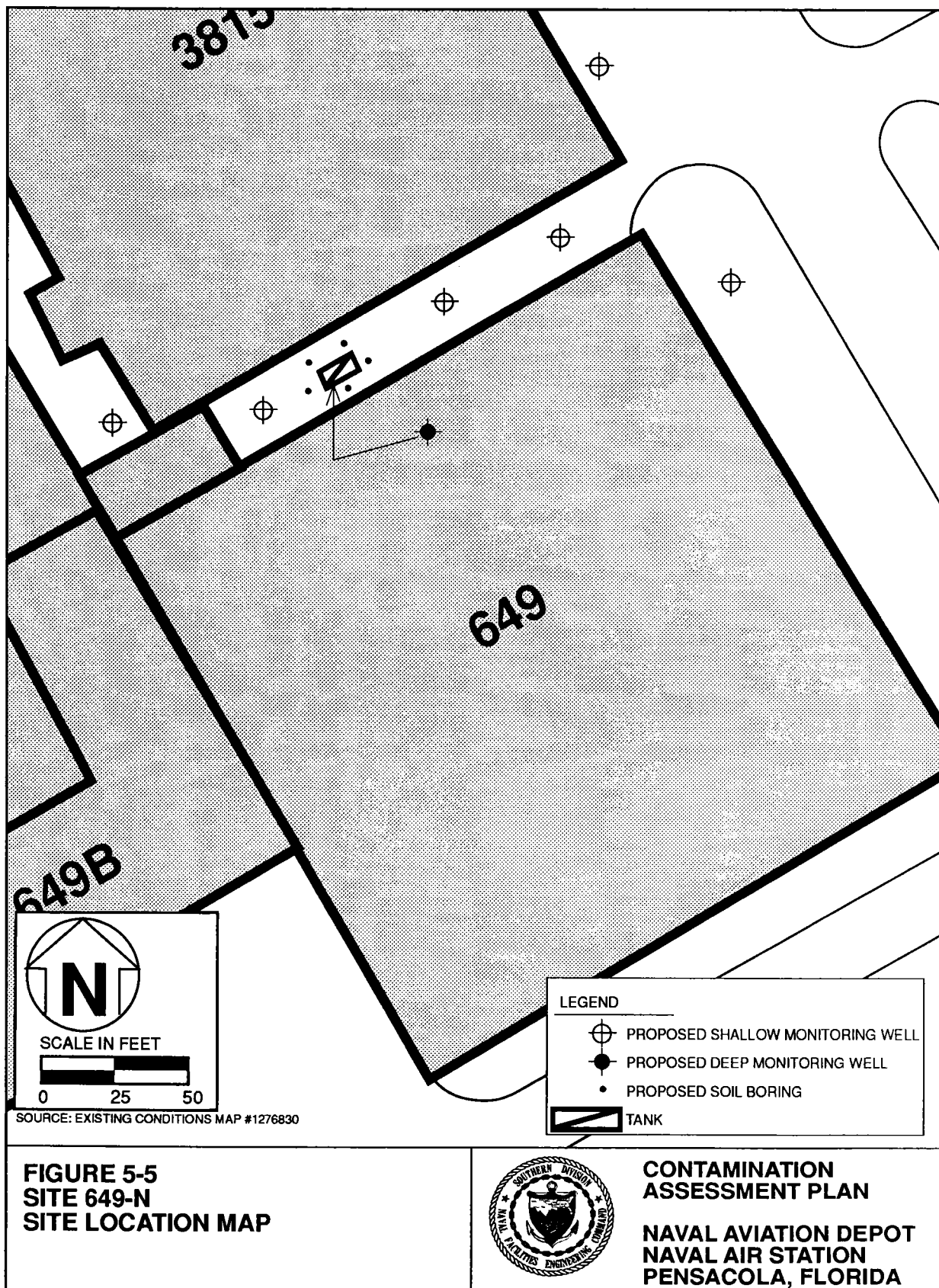
CONTAMINATION
ASSESSMENT PLAN

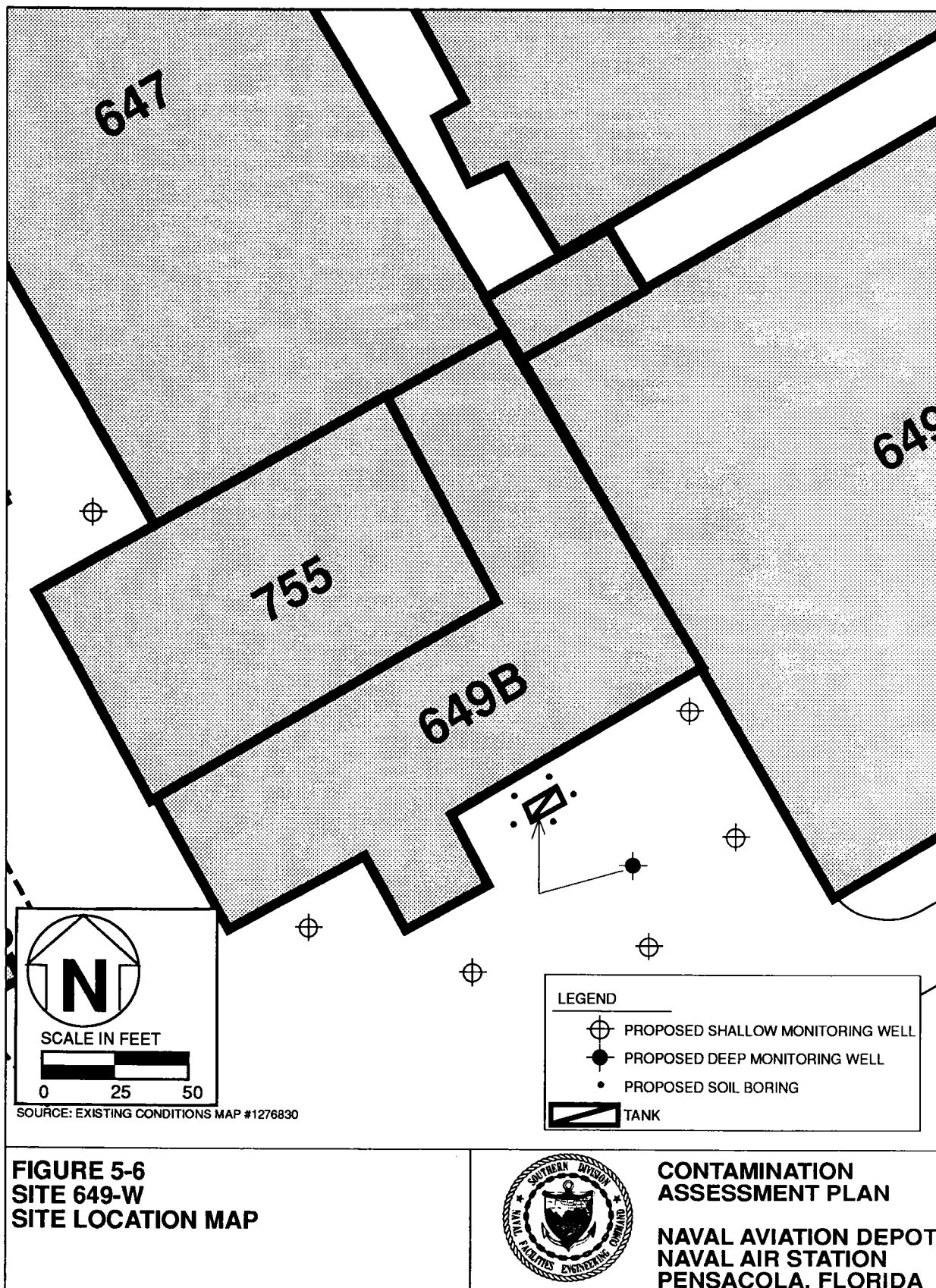
NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA

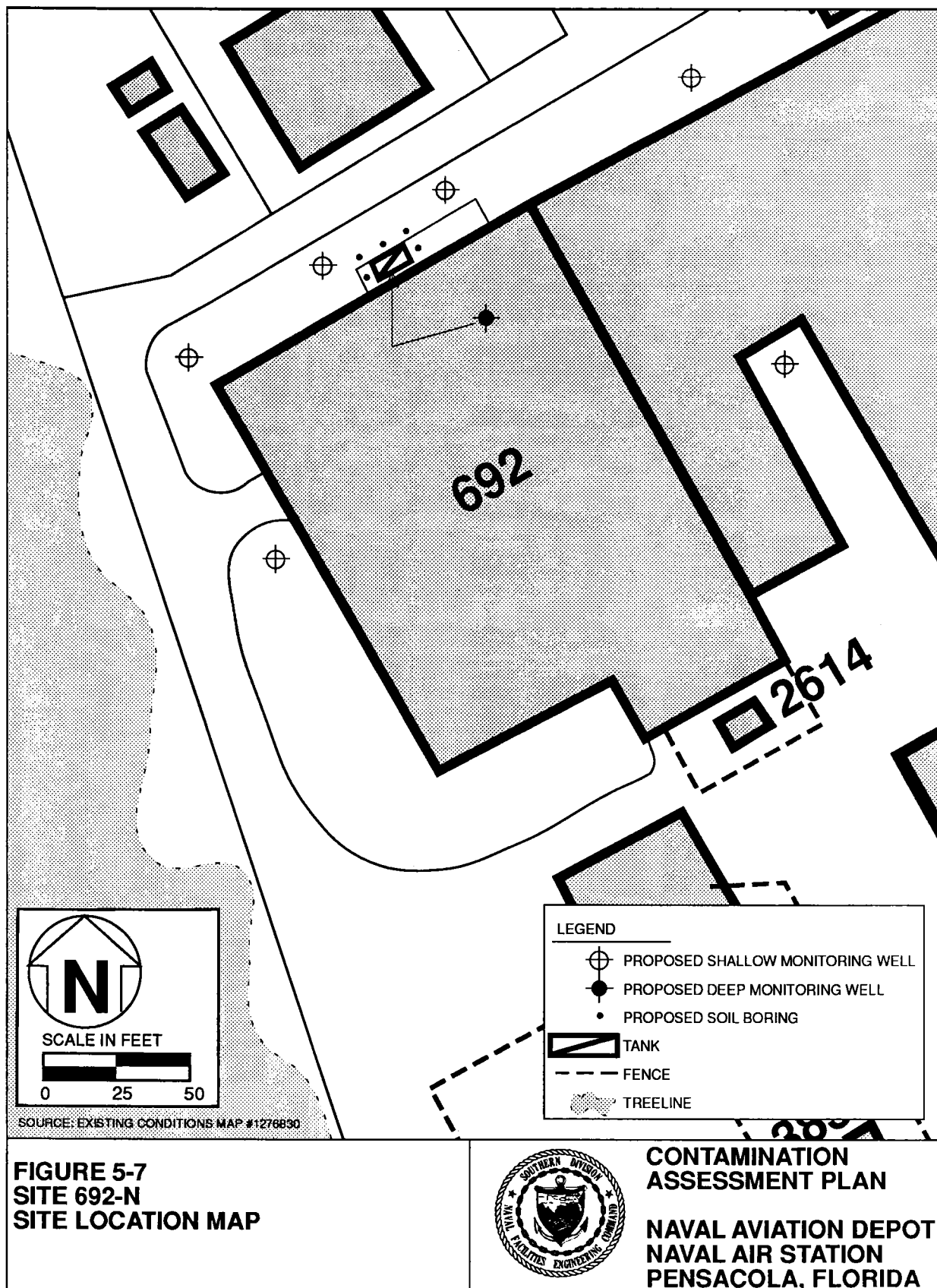












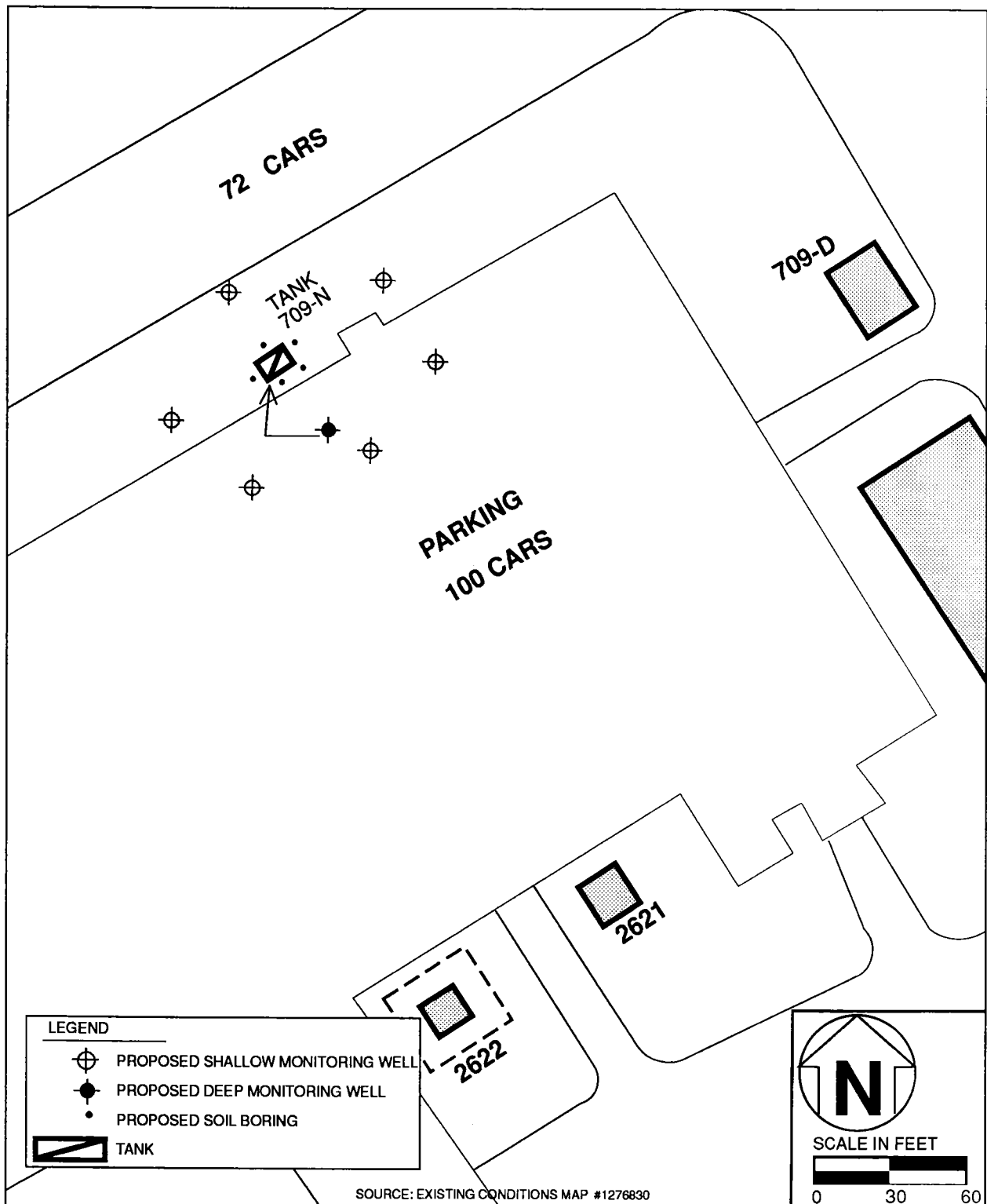


FIGURE 5-8
SITE 709D-N
SITE LOCATION MAP



CONTAMINATION
ASSESSMENT PLAN

NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA

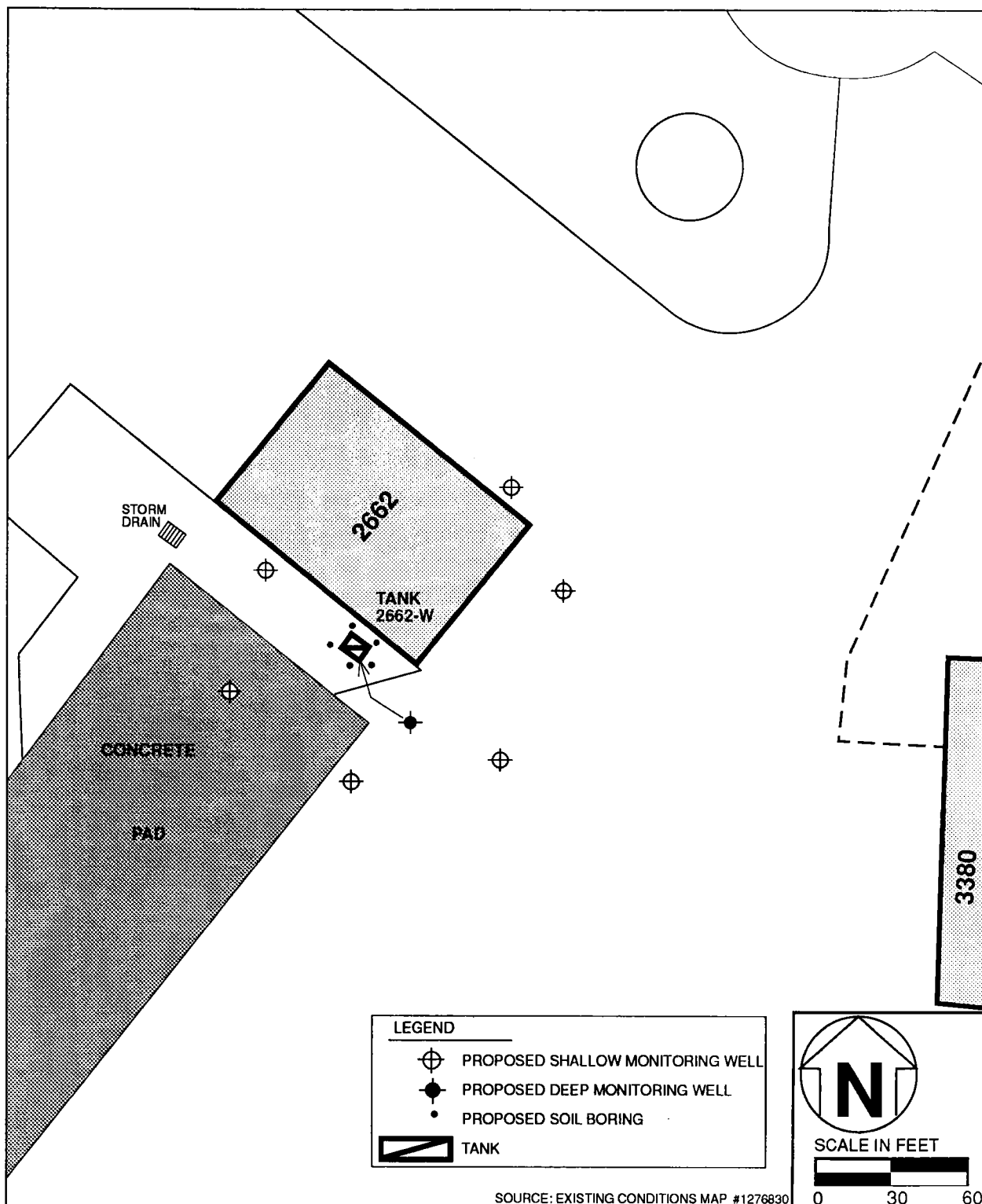
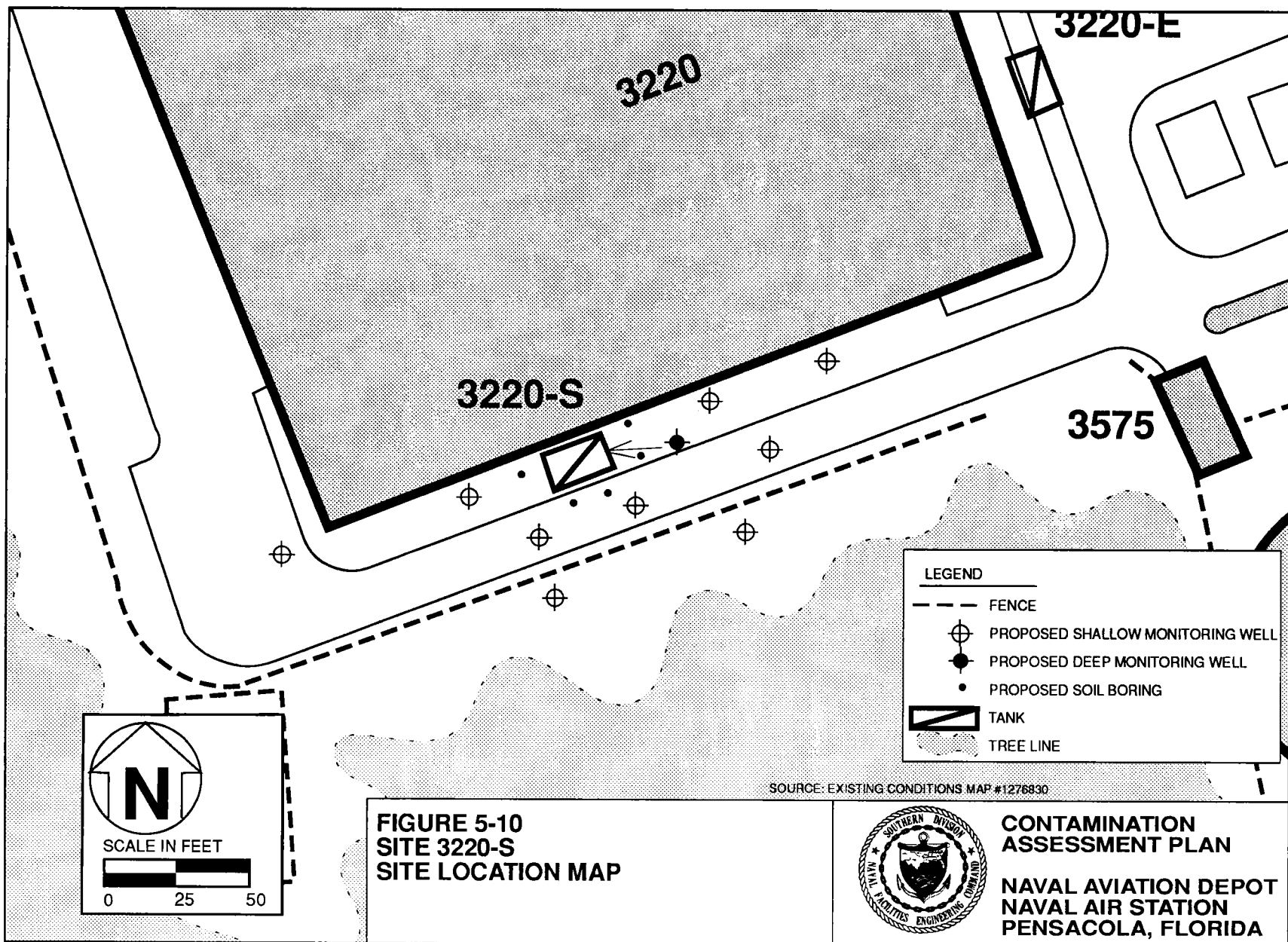


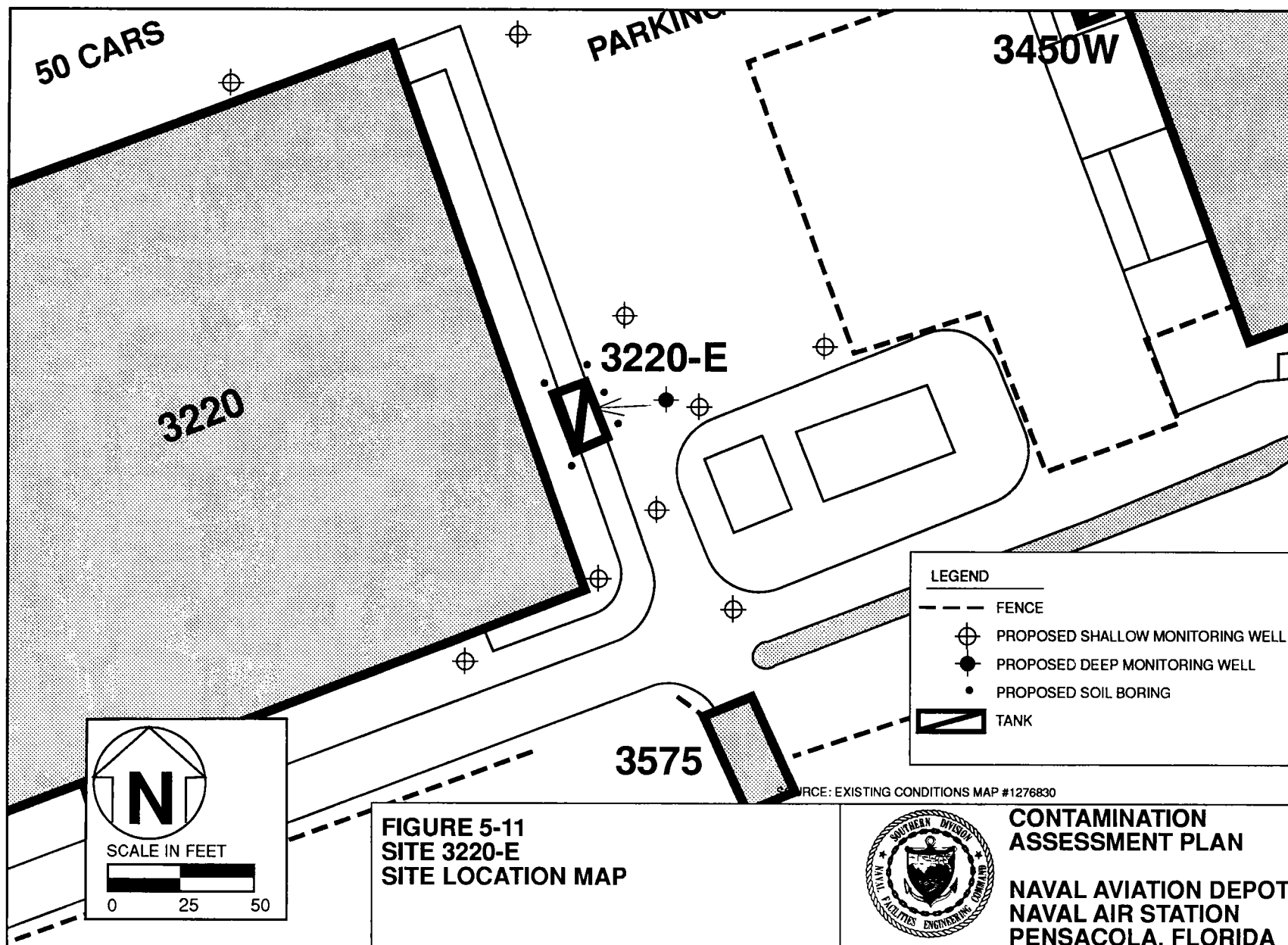
FIGURE 5-9
SITE 2662-W
SITE LOCATION MAP

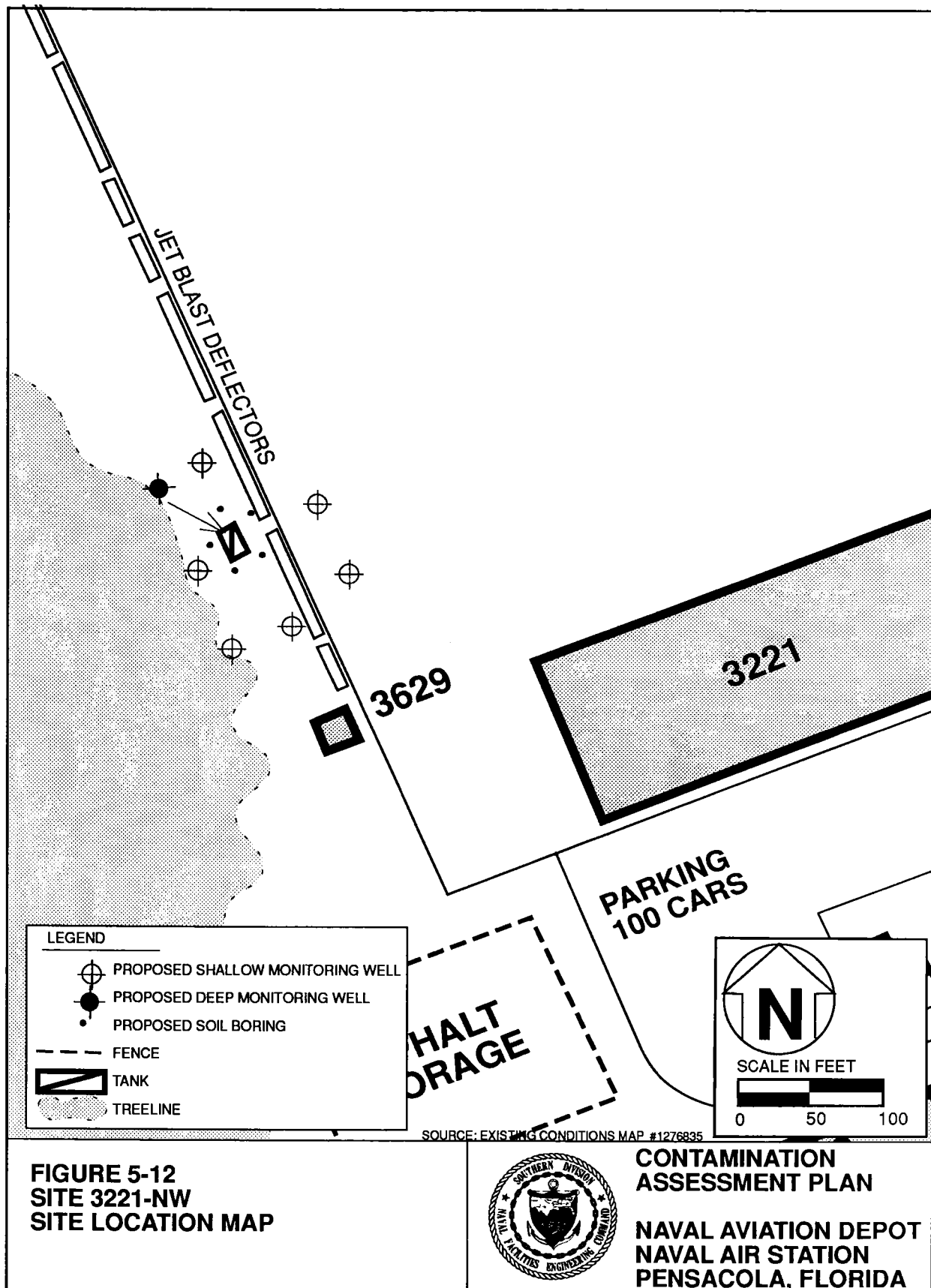


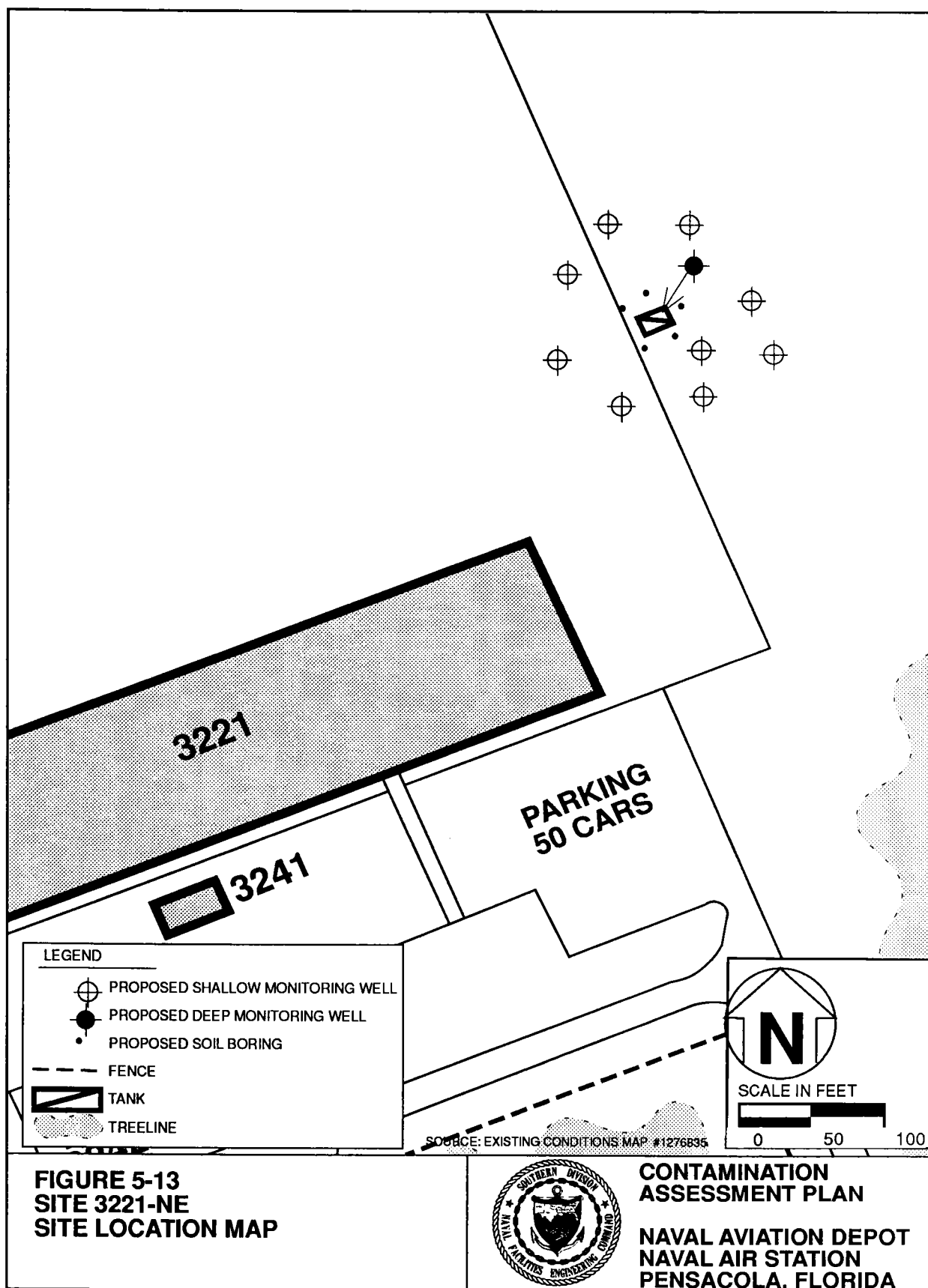
CONTAMINATION
ASSESSMENT PLAN

NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA









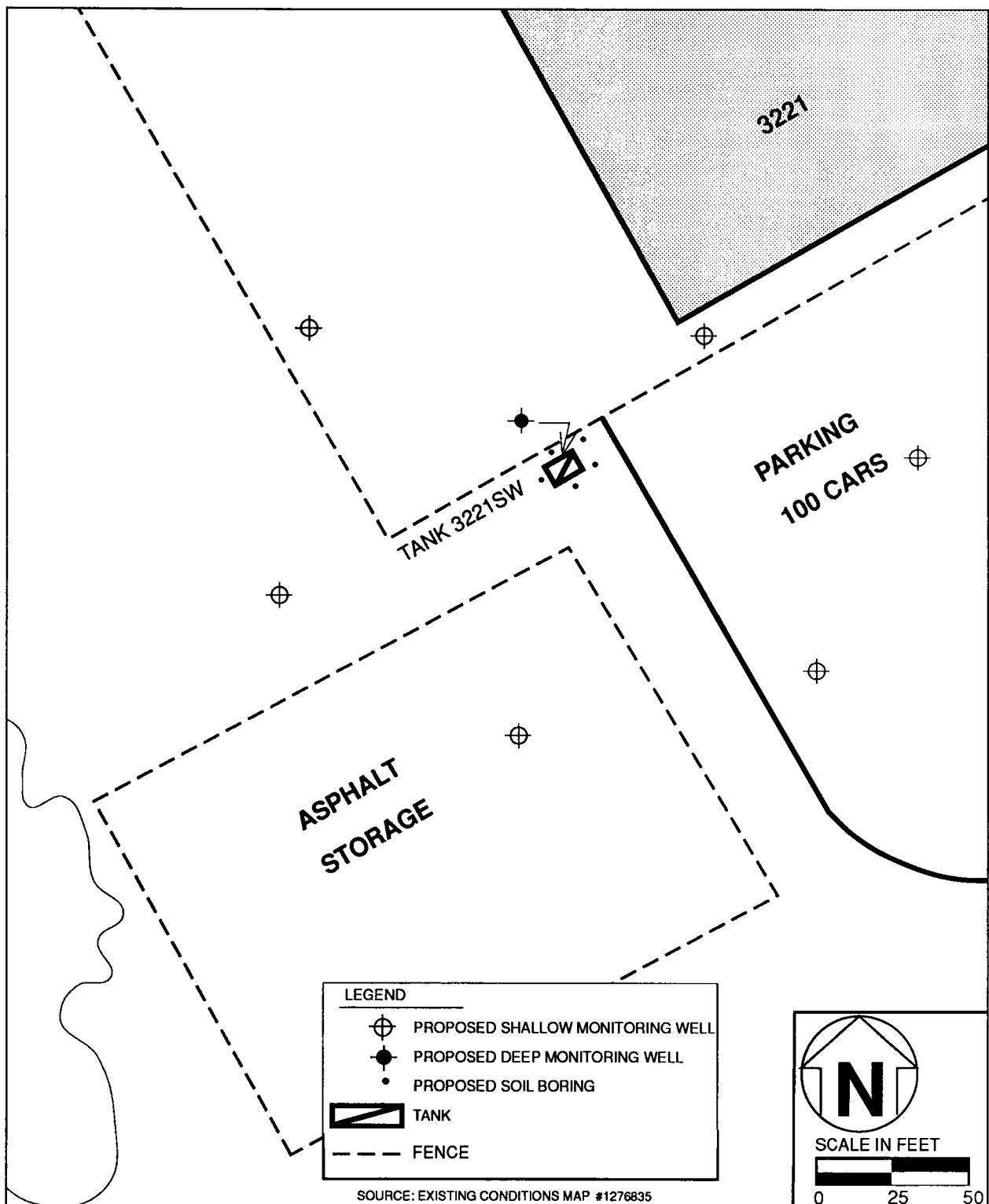
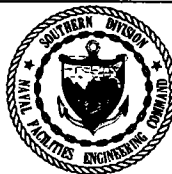
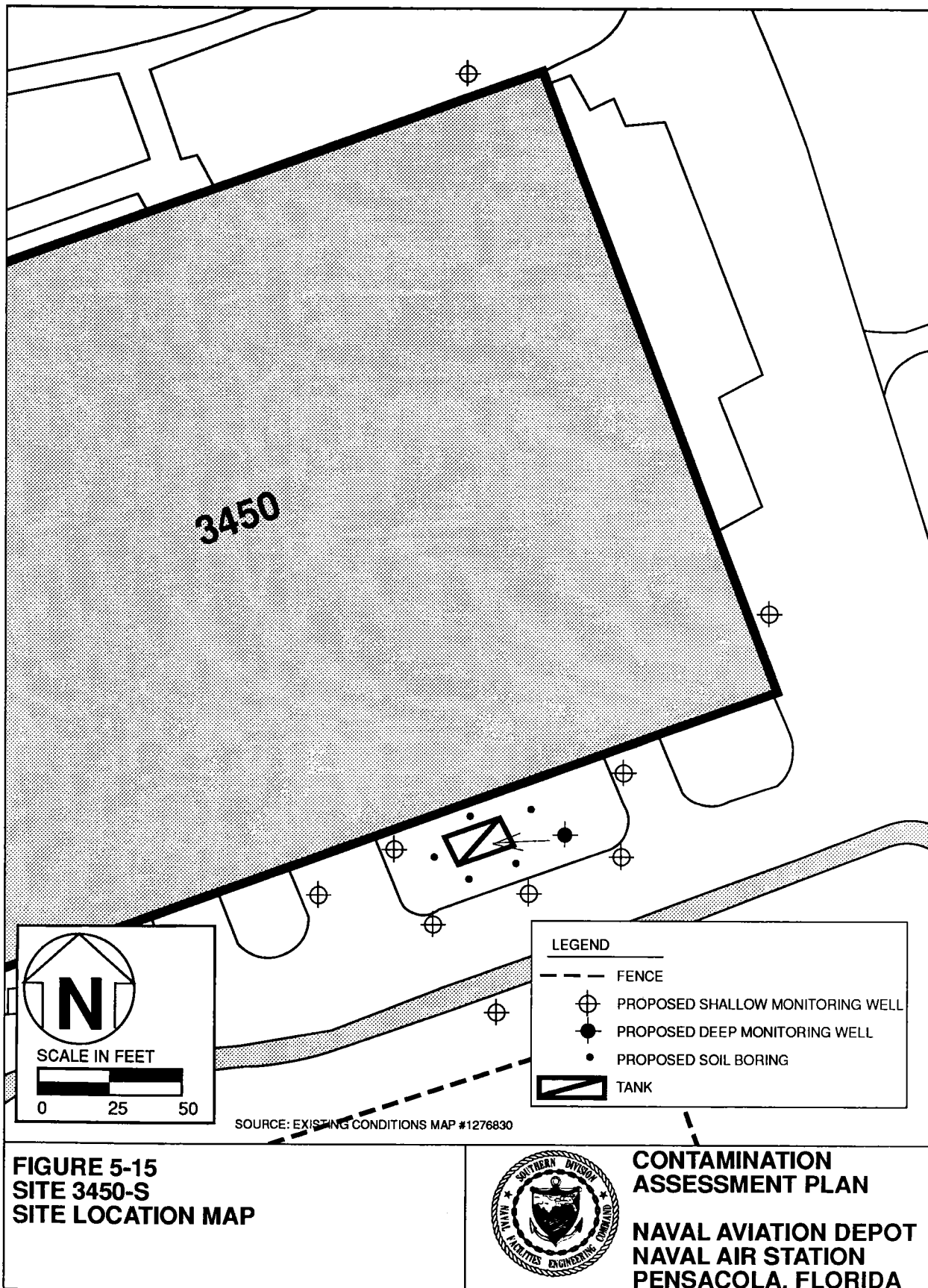


FIGURE 5-14
SITE 3221-SW
SOUTHWEST CORNER
SITE LOCATION MAP



CONTAMINATION
ASSESSMENT PLAN

NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA



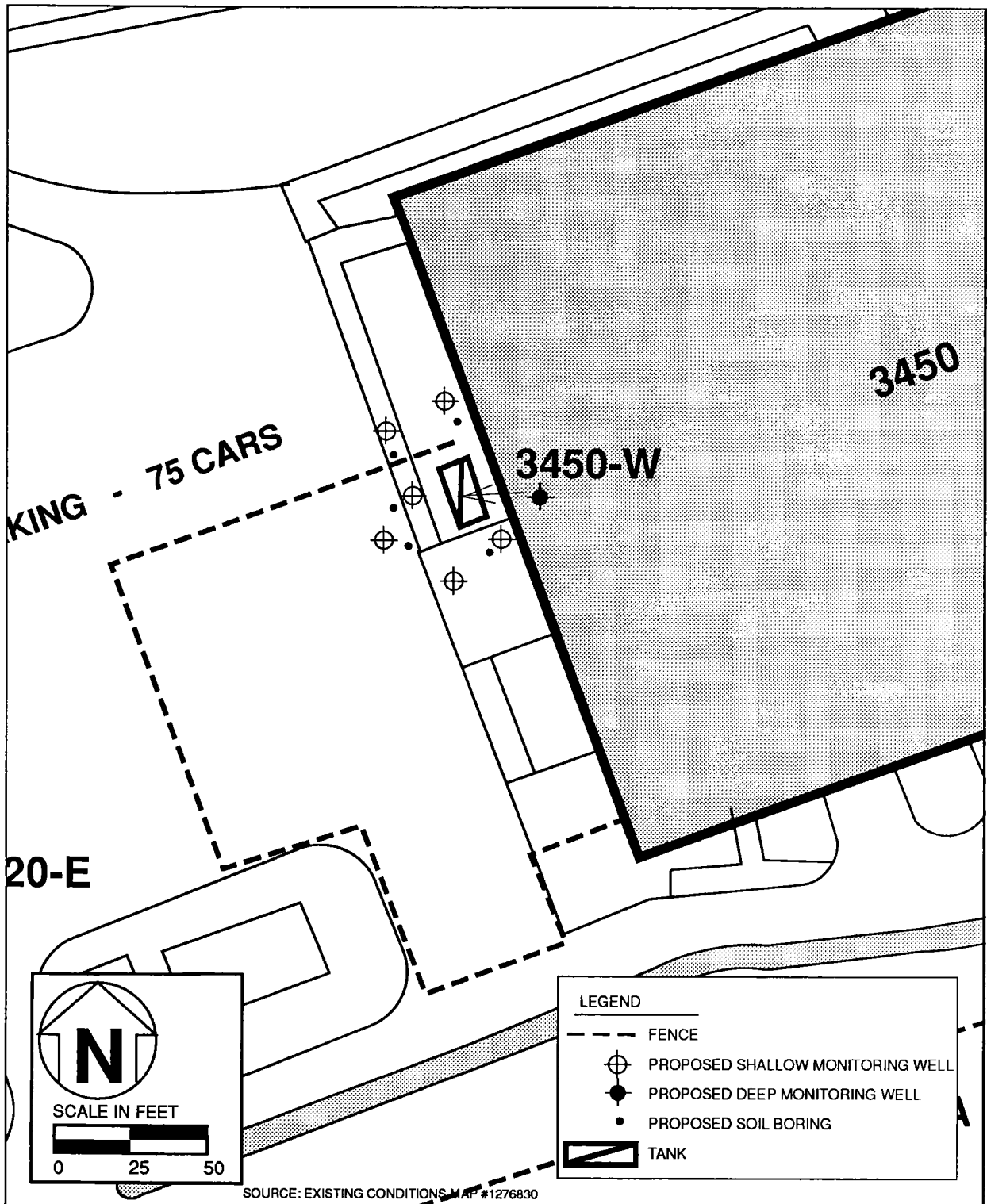
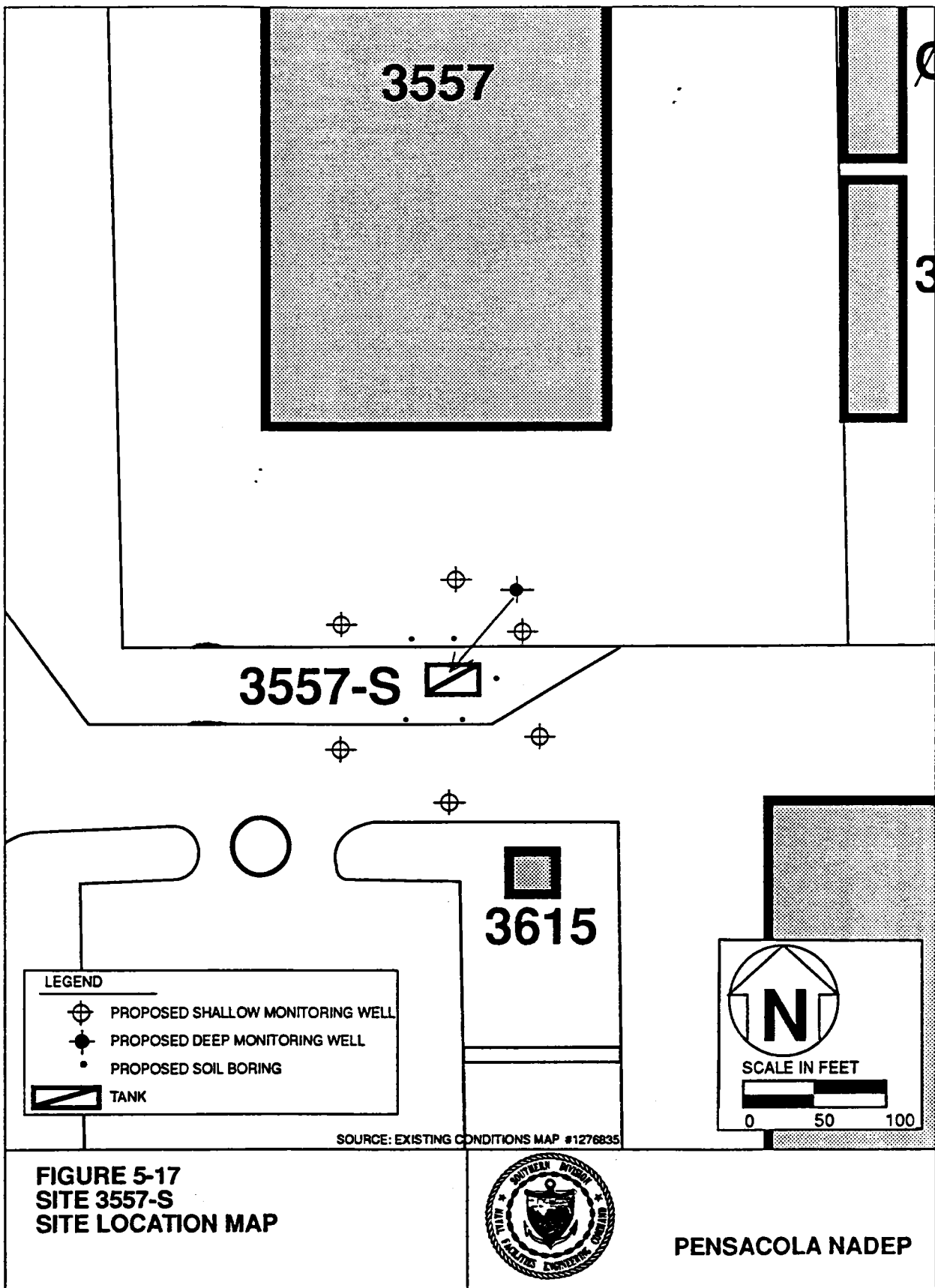


FIGURE 5-16
SITE 3450-W
SITE LOCATION MAP



**CONTAMINATION
 ASSESSMENT PLAN**

**NAVAL AVIATION DEPOT
 NAVAL AIR STATION
 PENSACOLA, FLORIDA**



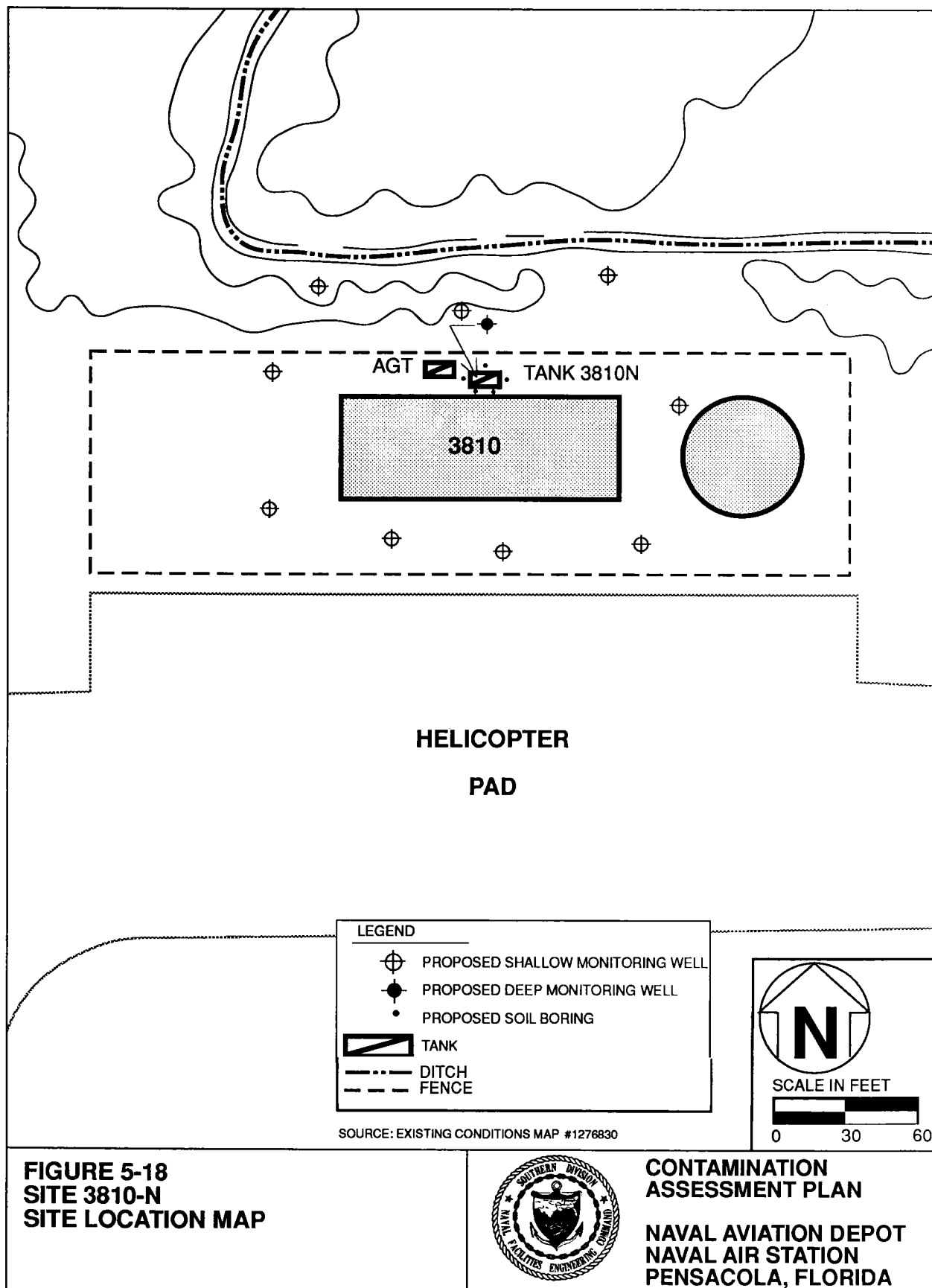


TABLE 5-1
PROPOSED SCOPE OF WORK FOR EACH SITE

Site	Soil borings	Analyses	Shallow wells	Deep wells	Analytical parameter group	Water samples
604-S	5	Yes	9	1	Waste Oil	14
607-NE	5	Yes	6	1	Waste Oil	11
647-N	5	Yes	6	1	Waste Oil	11
648-N	5	Yes	9	1	Waste Oil	14
649-N	5	Yes	6	1	Waste Oil	11
649-W	5	Yes	6	1	Waste Oil	11
692-N	5	Yes	9	1	Waste Oil	14
709D-N	5	Yes	6	1	Waste Oil	11
2662-W	5	No	6	1	Kerosene	11
3220-S	5	Yes	9	1	Waste Oil	14
3220-E	5	No	9	1	Kerosene	14
3221-NW	5	No	6	1	Kerosene	11
3221-NE	5	Yes	9	1	Waste Oil	14
3221-SW	5	Yes	6	1	Waste Oil	11
3450-S	5	No	9	1	Gasoline	14
3450-W	5	Yes	6	1	Waste Oil	11
3557-S	5	Yes	6	1	Waste Oil	11
3810-N	5	No	9	1	Kerosene	14

5.7 SITE 692-N. Building 692 is located between Murray Road and the golf course on the west side of Chevalier Field. Site 692-N formerly contained three 500-gallon tanks. Two tanks stored waste oil and the third tank was used to store PD680. The original tanks were installed in 1950 and later replaced. TRPH soil concentrations were reported to be 1,000 ppm and 4,000 ppm near the waste oil tanks, and 880 ppm near the PD680 tank.

5.8 SITE 709D-N. Building 709D is located northeast of Murray Road between the golf course and Chevalier Field on the east side of the parking lot. Site 709D-N formerly contained a 3,000-gallon waste oil (PD680) storage tank. The tank was installed in 1940 and was not replaced. TRPH soil concentrations were reported to be 250 ppm.

5.9 SITE 2662-W. Building 2662 is located in the southwest corner of Chevalier Field approximately 200 feet west of Pensacola Bay. Site 2662-W contained a 1,000-gallon JP-5 fuel storage tank. The original tank was installed in 1983 and later replaced. TRPH soil concentrations were reported to be 2,100 ppm. Visible product was observed on the water table.

5.10 SITE 3220-S. Building 3220 is located northeast of Murray Road and north of the water towers on the west side of Chevalier Field. Site 3220-S contained a waste oil storage tank of unknown volume. The original tank was installed in 1970 and was not replaced. TRPH soil concentrations were reported to be 2,900 ppm. Three other tanks, installed in 1976 and reported to contain 1,1,1-trichloroethane, were not found. No contamination was reported from these tanks. These tanks may have been removed during the construction of a water tower near the site.

5.11 SITE 3220-E. Building 3220 is located northeast of Murray Road and north of the water towers on the west side of Chevalier Field. Site 3220-E contained a 500-gallon diesel fuel storage tank. The tank was installed in 1970, abandoned in place, and replaced with a new 500-gallon aboveground tank during the tank removal program. The new tank location is approximately 30 feet north of the old location. TRPH soil concentrations were reported to be 18,000 ppm.

5.12 SITE 3221-NW. Building 3221 is located near the eastern edge of the Sherman Field runway. Site 3221-NW is the former location of a 500-gallon JP-5 waste fuel storage tank. The original tank was installed in 1967 and replaced during the tank removal program. The new tank was relocated to the southwest corner of Building 3221. TRPH soil concentrations were reported to be 530 ppm.

5.13 SITE 3221-NE. Building 3221 is located near the eastern edge of the Sherman Field runway. Site 3221-NE is the former location of a 500-gallon waste oil and JP-5 fuel storage tank. The original tank was installed in 1967 and replaced during the tank removal program. The new tank was relocated to the southeast corner of Building 3221. TRPH soil concentrations were reported to be 1,900 ppm.

5.14 SITE 3221-SW. Building 3221 is located near the eastern edge of the Sherman Field runway. Site 3221-SW is the former location of two tanks used to store PD680 and a detergent. The volumes of the tanks are unknown. The original tanks

were installed in 1967 and replaced with the new tank from the 3221-NW site. TRPH soil concentrations were reported to be 39 ppm and 57 ppm.

5.15 SITE 3450-S. Building 3450 is located near the northwest corner of Chevalier Field approximately 300 feet east-southeast of Building 3220. Site 3450-S contained a 1,000-gallon unleaded gasoline storage tank. The original tank was installed in 1971 and replaced with a new tank installed approximately 15 feet east of the former tank location. TRPH soil concentrations were reported to be 2,700 ppm. Additionally, three compliance monitoring wells were installed at the site near the location of the new tank.

5.16 SITE 3450-W. Building 3450 is located near the northwest corner of Chevalier Field approximately 300 feet east-southeast of Building 3220. Site 3450-W contained six tanks; three waste oil storage tanks and three PD680 storage tanks. The original tanks were installed in 1971. Only the PD680 tanks were replaced. TRPH soil concentrations were reported to be 80 ppm, 130 ppm, 99 ppm, 240 ppm and 330 ppm. In addition, a possible leak from an industrial waste pipeline located near the tanks has been reported.

5.17 SITE 3557-S. Building 3557 is located on the west side of Chevalier Field parallel to Industrial Boulevard. Site 3557-S contained two waste oil storage tanks. The capacities of the tanks were not reported. The original tanks were installed in 1982 and later replaced. TRPH soil concentrations were reported to be 140 ppm and 160 ppm.

5.18 SITE 3810-N. Building 3810 is located on the north side of Chevalier Field approximately 800 feet west of Pensacola Bay. Site 3810-N contained a 500-gallon fuel oil storage tank. The original tank was installed in 1982 and replaced with a 500-gallon aboveground tank during the tank removal program. TRPH soil concentrations were reported to be 1,600 ppm.

6.0 PROJECT SCHEDULE

Figure 6-1 is a Gantt chart detailing the proposed schedule and timeframe requirements to conduct the scope of services and complete the tasks described in this CAP. The dates shown for initiation of services conform with the schedule requirements agreed upon in the FDER and Navy Consent Order Agreement for investigation of petroleum sites in Florida.

The Phase I field investigation work is scheduled to begin in January 1992. The projected schedule to complete the Contamination Assessment Phase I field investigation program is approximately 5 weeks. The Phase II field investigation will be initiated after review of data gathered during the Phase I investigations. ABB-ES anticipates Phase II activities to be started approximately 1 week after completion of Phase I activities and completed approximately 20 weeks after initiation. After review and interpretation of Phase I and Phase II field data, a 90 percent draft CAR for each site will be prepared and submitted to SOUTHNAVFACENGCOM. Subsequent 100 percent draft finals and final CARs for each site will be submitted following SOUTHNAVFACENGCOM approval.

Schedule Name: NAVY CLEAN GANTT SCHEDULE
 Responsible : TASK ORDER MANAGER-PETER REDFERN
 As of Date : 6-Nov-91 Schedule File: CLEAN010

Select filter : NADEP PEN SCHEDULE

Task Name	Start Date	End Date	Dura (Day)	17	24	31	Sep 8	14	21	28	Oct 5	12	19	26	92 Nov 2	9
NADEP PENSACOLA NASP & CAP	7-Oct-91	23-Dec-91	52	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE DRAFT CAP AND NASP	7-Oct-91	13-Dec-91	46	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT DRAFT CAP AND NASP	7-Oct-91	8-Nov-91	24	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVEY REVIEW OF DRAFT CAP/NASP	29-Oct-91	29-Oct-91	0	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE FINAL CAP AND NASP	29-Oct-91	27-Nov-91	20	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT FINAL CAP AND NASP	27-Nov-91	13-Dec-91	10	.	.	.	.	.	.	.	.	.	.	.	.	.
NADEP PENSACOLA PH 1 FLD IMYST	23-Dec-91	23-Dec-91	0	.	.	.	.	.	.	.	.	.	.	.	.	.
NADEP PENSACOLA CAR	12-Dec-91	12-Dec-91	0	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE DRAFT CAR	6-Jan-92	10-Feb-92	25	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT DRAFT CAR TO NAVY	20-Jul-92	12-Nov-92	81	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVEY REVIEW DRAFT CAR	20-Jul-92	12-Nov-92	81	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE DRAFT FINAL CAR	20-Jul-92	17-Aug-92	20	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT DRAFT FINAL CAR TO NAVY	20-Jul-92	17-Aug-92	20	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVEY REVIEW DRAFT FINAL CAR	17-Aug-92	17-Aug-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE FINAL CAR	17-Aug-92	15-Sep-92	20	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT FINAL CAR TO NAVY	15-Sep-92	29-Sep-92	10	.	.	.	.	.	.	.	.	.	.	.	.	.
NADEP PENSACOLA PH11 FLD IMYST	15-Sep-92	29-Sep-92	10	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE DRAFT FINAL PRAP	29-Sep-92	29-Sep-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT DRAFT FINAL PRAP TO NAVY	29-Sep-92	29-Sep-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVEY REVIEW DRAFT FINAL PRAP	29-Sep-92	27-Oct-92	20	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE FINAL PRAP	29-Sep-92	27-Oct-92	20	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT FINAL PRAP TO NAVY	28-Oct-92	12-Nov-92	10	.	.	.	.	.	.	.	.	.	.	.	.	.
NADEP PENSACOLA PH11 FLD IMYST	28-Oct-92	12-Nov-92	10	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE DRAFT FINAL PRAP	12-Nov-92	12-Nov-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT DRAFT FINAL PRAP TO NAVY	12-Nov-92	12-Nov-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVEY REVIEW DRAFT FINAL PRAP	18-Feb-92	9-Jul-92	100	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE FINAL PRAP	24-Aug-92	12-Nov-92	56	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT FINAL PRAP TO NAVY	24-Aug-92	12-Nov-92	56	.	.	.	.	.	.	.	.	.	.	.	.	.
NADEP PENSACOLA PH11 FLD IMYST	24-Aug-92	29-Sep-92	25	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE DRAFT FINAL PRAP	24-Aug-92	29-Sep-92	25	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT DRAFT FINAL PRAP TO NAVY	29-Sep-92	29-Sep-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVEY REVIEW DRAFT FINAL PRAP	29-Sep-92	29-Sep-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE FINAL PRAP	29-Sep-92	27-Oct-92	20	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT FINAL PRAP TO NAVY	29-Sep-92	27-Oct-92	20	.	.	.	.	.	.	.	.	.	.	.	.	.
NADEP PENSACOLA PH11 FLD IMYST	28-Oct-92	12-Nov-92	10	.	.	.	.	.	.	.	.	.	.	.	.	.
PREPARE DRAFT FINAL PRAP	28-Oct-92	12-Nov-92	10	.	.	.	.	.	.	.	.	.	.	.	.	.
SUBMIT DRAFT FINAL PRAP TO NAVY	12-Nov-92	12-Nov-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.
NAVEY REVIEW DRAFT FINAL PRAP	12-Nov-92	12-Nov-92	0	.	.	.	.	.	.	.	.	.	.	.	.	.



CONTAMINATION ASSESSMENT PLAN
NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA

REFERENCES CITED

- Barr, G.L., 1987, Potentiometric surface of the upper Floridan aquifer in Florida, May 1985: Florida Geological Survey Map Series No. 119.
- Florida Department of Environmental Regulation, 1990, Risk assessment guidelines for non-Superfund sites: Bureau of Waste Cleanup, Technical Review Section, 6 p.
- Healy, H.G., 1980, Potentiometric surface of the upper Floridan aquifer in Florida: Florida Bureau of Geology Map Series 104.
- Marsh, O.T., 1966, Geology of Escambia and Santa Rosa Counties, Western Florida Panhandle: Florida Geological Survey Report of Investigations No. 46, 140 p.
- Musgrove, R.H., Barraclough, J.T., and Grantham, R.G., 1965, Water resources of Escambia and Santa Rosa Counties, Florida: Florida Geological Survey Report of Investigations No. 40, 102 p.
- U.S. Geological Survey, 1970, Fort Barrancas Quadrangle: 7-1/2-minute topographic series.



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Sampling, testing, mobile labs

ANALYTICAL REPORT

SUBCONTRACT: 1-08-134

TASK ORDER NUMBER: 0014, MOD. NO. 1

NAS/NADEP PENSACOLA, PHASE II

Presented to:

PETER REDFERN

ABB ENVIRONMENTAL SERVICES, INC.

WADSWORTH/ALERT LABORATORIES

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TAMPA, FL 33610

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Randall C. Grubbs
Laboratory Director - Florida

April 28, 1992



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INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola, Phase II site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Peter Redfern. The samples were accepted into Wadsworth's Florida facility on 11 April 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.



WADSWORTH/ALERT
LABORATORIES

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER	METHOD

METALS	
Arsenic	** EPA Method 206.2 ** SW846 Method 7060
Cadmium	** EPA Method 200.7 ** SW846 Method 6010
Chromium	** EPA Method 200.7 ** SW846 Method 6010
Lead	** EPA Method 239.2 ** SW846 Method 6010
Digestion	** SW846 Method 3050

NOTE: ** Indicates usage of this method to obtain results for this report.

EPA Methods -Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982
 Drinking Waters USEPA, 600/4-88/039, December, 1988.

Std. Methods -Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985.

USEPA Methods -From 40CFR Part 136, published in Federal Register on October 26, 1984.

SW846 Methods -Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

ASTM Methods -American Society for Testing and Materials.

NIOSH Method -NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1102-6
MATRIX : SOIL

DATE RECEIVED: 4/11/92

SAMPLE ID : 3221SW-MW3 (6') NADEP PENSACOLA

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - dry weight basis

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/23/92	ND	0.5 mg/kg
Cadmium	4/23- 4/24/92	ND	0.5 mg/kg
Chromium	4/23- 4/24/92	ND	2.5 mg/kg
Lead	4/23- 4/24/92	13	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1102-7
MATRIX : SOIL

DATE RECEIVED: 4/11/92

SAMPLE ID : 3221SW-MW4 (5') NADEP PENSACOLA

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - dry weight basis

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/23/92	ND	0.5 mg/kg
Cadmium	4/23- 4/24/92	ND	0.5 mg/kg
Chromium	4/23- 4/24/92	ND	2.5 mg/kg
Lead	4/23- 4/24/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1102-8
MATRIX : SOIL

DATE RECEIVED: 4/11/92

SAMPLE ID : 3221SW-MW5 (5-7') NADEP PENSACOLA

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - dry weight basis

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/23/92	ND	0.5 mg/kg
Cadmium	4/23- 4/24/92	ND	0.5 mg/kg
Chromium	4/23- 4/24/92	ND	2.5 mg/kg
Lead	4/23- 4/24/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1102-10
MATRIX : WATER

DATE RECEIVED: 4/11/92

SAMPLE ID : 3221SW-EQUIP BLANK NADEP PENSACOLA

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/24/92	ND	10 ug/L
Cadmium	4/24/92	ND	10 ug/L
Chromium	4/24/92	ND	50 ug/L
Lead	4/24- 4/25/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
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QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride
Toluene
2-Butanone
Acetone

Semi-volatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate

Metals

Calcium
Magnesium
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

*****EXAMPLE*****

COMPOUND	SAMPLE CONC.	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.	accep. method perform range	

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1102-BK
MATRIX : WATER

DATE RECEIVED: 4/11/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/24/92	ND	10	ug/L
Cadmium	4/24/92	ND	10	ug/L
Chromium	4/24/92	ND	50	ug/L
Lead	4/24- 4/25/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1102-BK
MATRIX : SOIL

DATE RECEIVED: 4/11/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - dry weight basis

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/23/92	ND	0.01	mg/L
Cadmium	4/23/92	ND	0.01	mg/L
Chromium	4/23/92	ND	0.05	mg/L
Lead	4/23/92	ND	0.05	mg/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS

MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS
METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD %REC	
Arsenic (furnace)	04/24/92	04/24/92	68	38 53-131	LCS
Cadmium	04/24/92	04/24/92	112	18 77-113	
Chromium	04/24/92	04/24/92	117	21 79-121	
Lead (furnace)	04/24/92	04/25/92	100	33 64-132	



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS

MATRIX : SOIL

LABORATORY CONTROL SAMPLE RESULTS
METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD %REC	
Arsenic furnace	04/23/92	04/23/92	92	36 51-125	LCS
Cadmium	04/23/92	04/23/92	101	22 67-113	
Chromium	04/23/92	04/23/92	110	22 73-118	
Lead	04/23/92	04/23/92	105	35 58-130	

**WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

Client: ABB Project Name/Number: NADEP Pen
Samples Received By: Carol McNulty Date Received: 4/11/92
(Signature)
Sample Evaluation Form By: Carol McNulty LAB No: 4236/201102-1610
(Signature)

Type of shipping container samples received in? WAL Cooler _____

Client Cooler ☒ WAL Shipper _____ Box _____ Other _____

Any "NO" responses or discrepancies should be explained in comments section.

- | | YES | NO |
|---|---------------|---------------|
| 1. Were custody seals on shipping container(s) intact? | <u> </u> | <u>X</u> |
| 2. Were custody papers properly included with samples? | <u>X</u> | <u> </u> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? | <u>X</u> | <u> </u> |
| 4. Did all bottles arrive in good condition (unbroken)? | <u>X</u> | <u> </u> |
| 5. Were all bottle labels complete (Sample No., date, signed, analysis preservatives)? | <u>X</u> | <u> </u> |
| 6. Were correct bottles used for the tests indicated? | <u>X</u> | <u> </u> |
| 7. Were proper sample preservation techniques indicated? | <u>X</u> | <u> </u> |
| 8. Were samples received within adequate holding time? | <u>X</u> | <u> </u> |
| 9. Were all VOA bottles checked for the presence of air bubbles?
(If air bubbles were found indicate in comment section) | <u>N/A</u> | <u> </u> |
| 10. Were samples in direct contact with wet ice?
(NOTE TEMPERATURE BELOW) | <u>X</u> | <u> </u> |
| 11. Were samples accepted into the laboratory?
(If no see comments) | <u>X</u> | <u> </u> |

Cooler # _____ Temp 6 °C Cooler # _____ Temp _____ °C
Cooler # _____ Temp _____ °C Cooler # _____ Temp _____ °C

Comments: _____

CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT NO.		PROJECT NAME				NO. OF CONTAINERS	SAMPLE TYPE												REMARKS INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE
SAMPLERS (SIGNATURE)																			
STA. NO.	DATE	TIME	COMP.	GRAB	STATION LOCATION														
41	4/8/92	1330		X	2662W - SB 11	1	1											SOIL	
41	4/8/92	1420		X	2662W - SB 12	1	1											SOIL	
	4/8/92	1435		X	2662W - EQUIP BLANK	1	1											WATER	
21	4/8/92	1540		X	2662W - SB 13	1	1											SOIL	
	4/8/92	1540		X	2662W - DUPLICATE	1	1											SOIL	
31	4/9/92	0740		X	2662W - SB 14	1	1											SOIL	
61	4/9/92	1140		X	3221SW - MW 3	1	1											SOIL	
51	4/11/92	0730		X	3221SW - MW 4	1	1											SOIL	
5-7	4/11/92	0910	X		3221SW - MW 5	1	1											SOIL	
	4/11/92	0915		X	3221SW - EQUIP BLANK	1	1											WATER	
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)		RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)									
<i>[Signature]</i>		4/11/92 1600		<i>[Signature]</i>															
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)		RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)									
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED FOR DISPOSAL BY: (SIGNATURE)		DATE/TIME		REMARKS											



WADSWORTH/ALERT
LABORATORIES
Sampling, testing, mobile labs

5910 Breckenridge Pkwy.
Suite H
Tampa, FL 33610

Chain of Custody Record

(813) 621-0784
Fax (813) 623-6021

Record _____ of _____

08201

Client: <u>A/B</u>		Project Name / Location <u>HAZOP 2nd</u>			No. OF CON-TAINERS	Parameter												Remarks		
Sampler(s) <u>Ryan D. Lee</u>		Project #: <u>3721 SW</u>				VOC -	PAH -	METALS -	TRPH -	EDB -										
Item #	Date	Time	MATRIX	Sample Location																
1	8/25/02	1515	SOIL	SB 1 (S')	1			1												
2	8/27/02	1630	SOIL	SB 11 (S')	1			1												
3	8/25/02	1705	SOIL	SB 11 (S')	1			1												
4	8/25/02	1510	WATER	EXTRACT BLANK	1			1												
5	8/27/02	1540	SOIL	SB 12 (S')	1			1												
6	8/27/02	1605	SOIL	SB 13 (S')	1			1												
7																				
8																				
9																				
10																				
11																				

Total Containers

6

Number of Coolers in Shipment

1

Bailers

Report To:

Additional Comments:

Transfer Number

Item Number(s)

Relinquished By / Company

Accepted By / Company

Date

Time

1

2

3

4

5

6

Ryan D. Lee / A/B

Original Accompanies Shipment



WADSWORTH/ALERT
LABORATORIES

5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0014

NAS/NADEP PENSACOLA - PHASE I

Presented to:

ROGER DURHAM

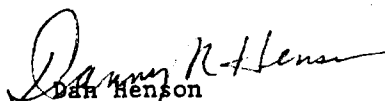
ABB ENVIRONMENTAL SERVICES, INC.


WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FL 33610

(813) 621-0784


Dan Henson
Project Manager


Randall C. Grubbs
Laboratory Director - Florida

January 30, 1992



HEADQUARTERS AND
LABORATORY
P.O. Box 2912
4101 Shuffel Drive, N.W.
North Canton, OH 44720
(216) 497-9396

REGIONAL
LABORATORY
P.O. Box 31454
5405 Schaaf Rd.
Cleveland, OH 44131
(216) 642-9151

REGIONAL
OFFICE
1445 Pisgah Church Rd.
Lexington, SC 29072
(803) 957-8590

REGIONAL
LABORATORY
5910 Breckenridge Pkwy
Suite H
Tampa, FL 33610
(813) 621-0784



WADSWORTH/ALERT
LABORATORIES

INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola - Phase I site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Roger Durham. The samples were accepted into Wadsworth's Florida facility on 9 January 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.



WADSWORTH/ALERT
LABORATORIES

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER

METHOD

Arsenic
Cadmium
Chromium
Lead

METALS

** SW846 Method 7060
** SW846 Method 6010
** SW846 Method 6010
** SW846 Method 7421

NOTE: ** Indicates usage of this method to obtain results for this report.

EPA Methods -Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982
Drinking Waters USEPA, 600/4-88/039, December, 1988.
Std. Methods -Standard Methods for the Examination of Water and Wastewater, APHA, 16th edition, 1985.
USEPA Methods -From 40CFR Part 136, published in Federal Register on October 26, 1984.
SW846 Methods -Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.
ASTM Methods -American Society for Testing and Materials.
NIOSH Method -NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2A0901-1
MATRIX : SOIL

DATE RECEIVED: 1/ 9/92

SAMPLE ID : PEN-3221SW-SB1 (5-7) T.O. #0014

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	1/13- 1/17/92	ND	0.5 mg/kg
Cadmium	1/13- 1/14/92	ND	0.5 mg/kg
Chromium	1/13- 1/14/92	ND	2.5 mg/kg
Lead	1/13- 1/14/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2A0901-2
MATRIX : SOIL

DATE RECEIVED: 1/ 9/92

SAMPLE ID : PEN-3221SW-SB2-5 T.O. #0014

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	1/13- 1/17/92	ND	0.5 mg/kg
Cadmium	1/13- 1/14/92	ND	0.5 mg/kg
Chromium	1/13- 1/14/92	ND	2.5 mg/kg
Lead	1/13- 1/14/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.

DATE RECEIVED: 1/ 9/92

LAB #: 2A0901-3

MATRIX : SOIL

SAMPLE ID : PEN-3221SW-SB3-5

T.O. #0014

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	1/13- 1/17/92	ND	0.5 mg/kg
Cadmium	1/13- 1/14/92	ND	0.5 mg/kg
Chromium	1/13- 1/14/92	ND	2.5 mg/kg
Lead	1/13- 1/14/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.

DATE RECEIVED: 1/ 9/92

LAB #: 2A0901-4

MATRIX : SOIL

SAMPLE ID : PEN-3221SW-SB4 (5-7) T.O. #0014

CERTIFICATION #: E84059

**METALS ANALYTICAL REPORT
SELECTED LIST**

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	1/13- 1/17/92	ND	0.5 mg/kg
Cadmium	1/13- 1/14/92	ND	0.5 mg/kg
Chromium	1/13- 1/14/92	ND	2.5 mg/kg
Lead	1/13- 1/14/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride
Toluene
2-Butanone
Acetone

Semi-volatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate

Metals

Calcium
Magnesium
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

*****EXAMPLE*****

COMPOUND	SAMPLE CONC.	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150

(cmpd. name)	sample	1st%	2nd%	Rel.%	accep. method
	result	recov.	recov.	diff.	perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2A0901-BK
MATRIX : SOIL

DATE RECEIVED: 1/ 9/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	1/13- 1/17/92	ND	0.01 mg/L
Cadmium	1/14- 1/17/92	ND	0.01 mg/L
Chromium	1/13- 1/14/92	ND	0.05 mg/L
Lead	1/13- 1/14/92	ND	0.05 mg/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

LAB #: 2A0901-LCS
MATRIX: SOIL

DATE RECEIVED: 01/09/92
DATE PREP'D: 01/14/92 to
01/17/92
DATE ANALYZED: 01/14/92 to
01/17/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Arsenic, furnace	95	51-124
Cadmium	90	67-113
Chromium	100	73-117
Lead	93	58-130



WADSWORTH/ALERT
LABORATORIES

LAB#: 2A0901-1
MATRIX: SOIL

DATE RECEIVED: 01/09/92
DATE PREP'D: 01/13/92
DATE ANALYZED: 01/14/92 to
01/20/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
INORGANIC PARAMETERS - METALS

ELEMENT	MS %REC	MSD %REC	RPD	QC LIMITS	
				RPD	RECOVERY
Arsenic, furnace	81	82	1	15	51-124
Cadmium	86	87	1	17	73-107
Chromium	97	100	3	14	80-108
Lead	97	94	3	34	65-135

**WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

Client: ABB Project Name/Number: T.O. # 0014

Samples Received By: [Signature] Date Received: 9 JAN 92
(Signature)

Sample Evaluation Form By: [Signature] LAB No: 3605/2A0901-184
(Signature)

Type of shipping container were samples received in? WAL Cooler _____

Client Cooler ☒ WAL Shipper _____ Box _____ Other _____

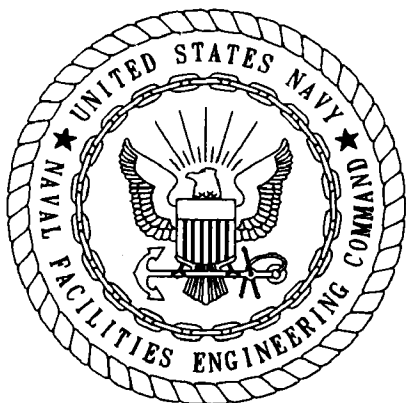
Any "NO" responses or discrepancies should be explained in comments section.

- | | YES | NO |
|---|---------------|---------------|
| 1. Were custody seals on shipping container(s) intact? | <u> </u> | <u>X</u> |
| 2. Were custody papers included with samples? | <u>X</u> | <u>X</u> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? | <u>X</u> | <u> </u> |
| 4. Did all bottles arrive in good condition (unbroken)? | <u>X</u> | <u> </u> |
| 5. Were all bottle labels complete (Sample No., date, signed, analysis, preservatives)? | <u>X</u> | <u> </u> |
| 6. Were correct bottles used for the tests indicated? | <u>X</u> | <u> </u> |
| 7. Were proper sample preservation techniques indicated? | <u>X</u> | <u> </u> |
| 8. Were samples received within adequate holding time? | <u>X</u> | <u> </u> |
| 9. Were all VOA bottles checked for the presence of air bubbles?
(If air bubbles were found indicate in comment section) | <u>N/A</u> | <u> </u> |
| 10. Were samples in direct contact with wet ice?
(NOTE TEMPERATURE BELOW) | <u>X</u> | <u> </u> |
| 12. Were samples accepted into the laboratory?
(If no see comments) | <u>X</u> | <u> </u> |

Cooler # _____ Temp 1 °C Cooler # _____ Temp _____ °C

Cooler # _____ Temp _____ °C Cooler # _____ Temp _____ °C

Comments: _____



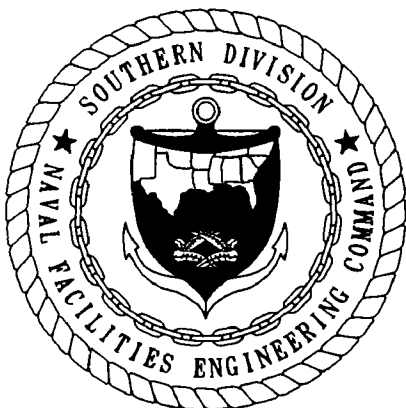
DRAFT FINAL



CONTAMINATION ASSESSMENT REPORT

**SITE 3221NW
NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

JULY 1992



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA
29411-0068**

DRAFT FINAL
NOT FOR PUBLIC RELEASE

3221 NW

CLEAN Review Documentation Record

Contamination Assessment Report

3221 NW

Client:

NAPFP Pensacola

Authors:

R. Durkin

Date:

7/28/92

Document No.

Job No.

07527-50

Draft: ☒

Final: ☒

Task Order Manager Review

Name:

MICHAEL J. WILLIAMS

Signature:

Michael J. Williams

Date:

7/29/92

Comments:

very minor revisions

Contracts/Purchasing Review

Name:

Signature:

Date:

Comments:

Other Reviewers

as identified by Task Order Manager

Name:

Joe Ben

Date:

7/29/92

Name:

Date:

Name:

Date:

NOTE:

Tracking form must accompany deliverable to project file.

Document can be released to Navy.

AFER ARM

Melba D. Ginn
Program Manager

29 July 92
Date

ABB Environmental Services, Inc.

Navy CLEAN Review Documentation Record

Document title: Contamination Assessment Report
 Site name: 3221 NW
 Client: NADEP Pensacola
 Authors: Rogere Durbin
 Date: 6/23/92
 Document No. _____
 Job No. 07527-50 Draft: ☒ Final: ☐

Task Order Manager Review

Name: _____
 Signature: _____
 Date: _____
 Comments: _____

Contracts/Purchasing Review

Name: _____
 Signature: _____
 Date: _____
 Comments: _____

Other Reviewers as identified by Task Order Manager

Name: LO Hagg
 Date: 6/26/92
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CONTAMINATION ASSESSMENT REPORT

**SITE 3221NW
NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

UIC: N00204

Contract No. N62467-89-D-0317

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July 1992



FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Environmental Coordinator, Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, at 904-452-2320, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 1843, at AUTOVON 563-0613 or 803-743-0613.

EXECUTIVE SUMMARY

During an underground storage tank (UST) removal program conducted by the U.S. Navy in 1989 and 1990, 18 sites at the Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, were identified as having soil contamination exceeding State regulatory standards for total recoverable petroleum hydrocarbons (TRPH). ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) for each of the 18 sites.

Site 3221NW is the former location of a 500-gallon JP-5 waste fuel UST. The UST was installed in 1967, and was located approximately 300 feet north of the northwest corner of Building 3221, which is located on the eastern perimeter of Forrest Sherman Air Field. The UST was removed from the site during the tank removal program.

Soil borings and monitoring wells were placed at the site during the CA to assess the degree of soil and groundwater contamination. Soil and groundwater samples were collected and analyzed for appropriate parameters. Locations of soil borings and monitoring wells and laboratory analytical results are summarized in the Executive Summary Figure. The findings, conclusions, and recommendations of the CAR are summarized below.

Findings

- The net groundwater flow direction at the site is to the east.
- No significant petroleum hydrocarbons were identified in soils at the site by organic vapor analyzer (OVA) headspace analysis. The highest OVA reading was found in soil boring SB-3 at a reported concentration of 2 parts per million (ppm). This concentration is significantly below the State allowable of 10 ppm for constituents of the kerosene analytical group.
- Contaminants identified in the groundwater were chloroform, toluene, and TRPH. None exceeded State regulatory standards.
- No potable wells were identified within a 0.25 mile radius of the site.

Conclusions

- The level of soil and groundwater contamination at the site appears to be minimal, is below State regulatory standards, and is not expected to impact potable water supplies on the base.

Recommendations

Based on the findings and conclusions of the CAR, *A No Further Action Proposal (NFAP)* is recommended for site 3221NW.



NOT SAMPLED

PZ-5/SB-6



GRASS

GRASS

CHLOROFORM 3

PZ-2/SB-3



CHLOROFORM 3

PZ-1/SB-2



JET BLAST DEFLECTOR

CHLOROFORM 2
TOLUENE 1
TRPH 4

FORMER UST
LOCATION

JET BLAST DEFLECTOR

MW-1
/SB-1

PZ-3/SB-4

CHLOROFORM 2

PZ-4/SB-5

CHLOROFORM 3
TOLUENE 7

CONCRETE

CONCRETE

LEGEND



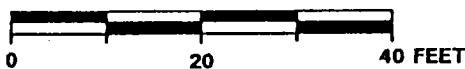
MONITORING WELL/PIEZOMETER/BORING LOCATION



CONCENTRATION (ppb)

TRPH Reported in ppm and DENOTES TOTAL
RECOVERABLE PETROLEUM HYDROCARBONS

SCALE



EXECUTIVE SUMMARY FIGURE



CONTAMINATION
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PENSACOLA, FLORIDA

ACKNOWLEDGMENTS

In preparing this report, The Underground Storage Tank Section of the Navy Comprehensive Long-Term Environmental Action, Navy (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel of the Naval Aviation Depot (NADEP), Pensacola, Florida, and Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). In particular, ABB-ES acknowledges the effort provided by the following people during the investigation and preparation of this report.

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Luis Vazquez	Environmental Engineer	Engineer-in-Charge	SOUTHNAVFACENGCOM
Danny Freeman	Environmental Coordinator	Environmental Coordinator	NADEP Pensacola

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- Appendix C: Investigative Methodologies and Procedures
- Appendix D: Aquifer Parameter Calculations
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GLOSSARY

The following list contains many of the acronyms, initialisms, abbreviations, and units of measure used in this report.

ABB-ES	ABB Environmental Services, Inc.
BDL	below detection limits
BETX	benzene, ethyl benzene, toluene, and xylenes
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
ft/day	feet per day
ft ₂ /day	feet squared per day
ft/ft	feet per foot
ft/min	feet per minute
GC	gas chromatograph
HSWA	Hazardous and Solid Waste Amendments of 1984
ID	inside diameter
K	hydraulic conductivity
msl	mean sea level
µg/l	micrograms per liter
µmhos/cm	micromhos per centimeter
MOP	Monitoring Only Plan
NADEP	Naval Aviation Depot
NARF	Naval Air Rework Facility
NAS	Naval Air Station
NFAP	No Further Action Proposal
NGVD	National Geodetic Vertical Datum
OVA	organic vapor analyzer
PAH	polynuclear aromatic hydrocarbons
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SPT	standard penetration test
SWDA	Solid Waste Disposal Act of 1965
T	transmissivity
TRPH	total recoverable petroleum hydrocarbons
UIC	uniform identification code

GLOSSARY--Continued

USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank
V	average pore water velocity
VOA	volatile organic aromatics
VOC	volatile organic compounds

1.0 INTRODUCTION

In 1987, the Naval Air Rework Facility (NARF) in Pensacola, Florida, was renamed the Naval Aviation Depot (NADEP). NADEP Pensacola, Florida, formerly the operations and repair department of the Naval Air Station (NAS) Pensacola, is now a tenant command located on NAS facilities within the Pensacola Naval Base Complex. The Pensacola Naval Base Complex is located on the western edge of Pensacola Bay on State Route 295 (Navy Boulevard; Figure 1-1). NADEP Pensacola occupies approximately 130 acres at NAS Pensacola. The mission of NADEP Pensacola is to: maintain and operate facilities for, and perform a complete range of, depot-level rework operations on designated weapons systems, accessories, and equipment; manufacture parts and assemblies, as required; provide engineering services in hardware design; furnish technical services on aircraft maintenance and logistic problems; and perform other levels of aircraft maintenance.

During a tank removal program implemented by the U.S. Navy in 1989 and 1990, petroleum underground storage tanks (USTs) at various NADEP site locations were removed. In many cases, these tanks were replaced with new USTs. Tank contents were reportedly restricted to petroleum products ranging from waste oil, diesel fuel, unleaded gasoline, and PD-680 (a petroleum distillate solvent similar to mineral spirits). The reported volumes of the tanks varied from 500 to 3,000 gallons. Soil samples were collected from each tank excavation and analyzed for total recoverable petroleum hydrocarbons (TRPH). Based on TRPH concentrations, 18 sites were found to be non-compliant with Florida Department of Environmental Regulation (FDER) standards, as defined in Chapter 17-770, Florida Administrative Code (FAC).

ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for each of the 18 petroleum contaminated sites at NADEP. This CAR is submitted for one of the sites, Site 3221NW. The scope of services for the work at Site 3221NW is described in Contract Task Order (CTO) No. 008, the Plan of Action (POA), and the Contamination Assessment Plan (CAP) and included the following:

- drilling of soil borings and analyzing site soils to assess the extent of soil contamination,
- installing and sampling groundwater monitoring wells to assess the extent of groundwater contamination,
- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site.
- conducting a potable well inventory within a 0.25-mile radius of the site,
- conducting slug tests on select wells to estimate aquifer characteristics, and

- reducing and analyzing pertinent data gathered during the CA to complete this CAR.

The CA at Site 3221NW was conducted from January through February 1992. The following sections of the report present the background information, data compilation, results, conclusions, and recommendations of the CAR.

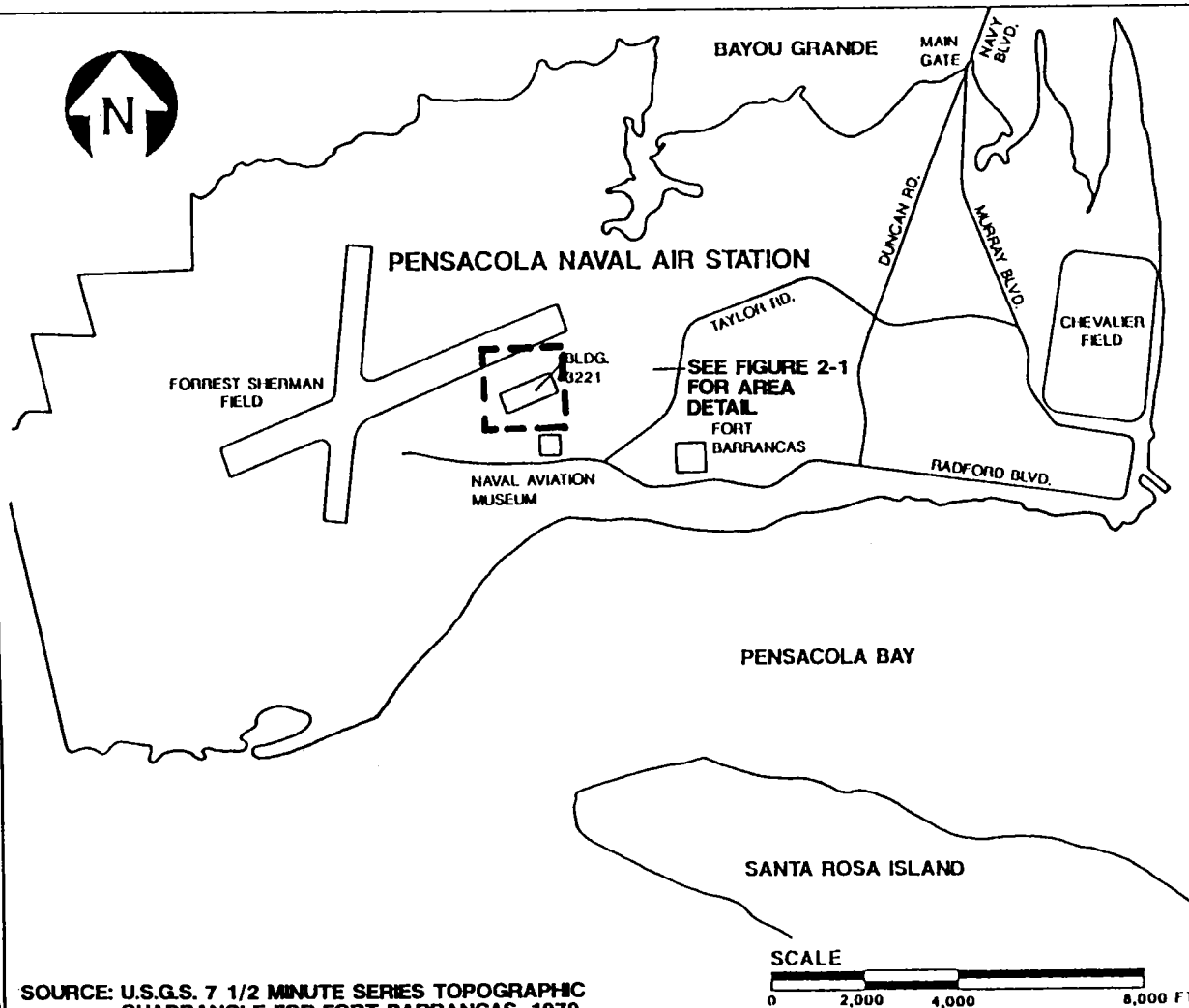
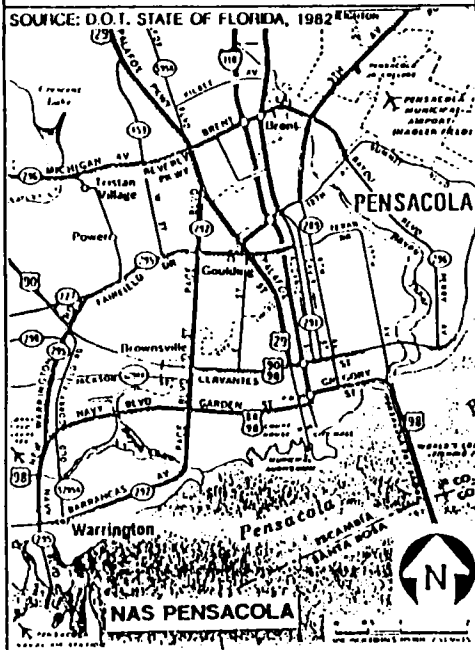


FIGURE 1-1
FACILITY LOCATION MAP



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2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. Site 3221NW is located approximately 300 feet north of the northwest corner of Building 3221, on the eastern perimeter of Forrest Sherman Field (Figure 2-1). Building 3221 is the location of various activities that primarily involve the restoration of airplanes and helicopters. Restoration activities include, but are not limited to, the use of paint and paint products. A large, 18-inch thick concrete apron extends north from Building 3221 to the intersection with the Sherman Field flightline. The concreted area in the immediate site vicinity appears to be primarily used for helicopter and airplane parking. Restoration activities appear to be performed away from the site and in the immediate vicinity of Building 3221.

The site is the former location of a 500-gallon UST reportedly used for the storage of water-contaminated JP-5 fuel. Figure 2-2 is a site plan showing the former UST location and surface features in the site vicinity. The UST was located in a grassy area between jet deflectors along the western edge of the concrete apron.

2.2 SITE HISTORY. The UST at Site 3221NW was reportedly installed in 1967. During the tank removal and installation program, the UST was removed from the site. A composite soil sample was collected from the former UST excavation and analyzed for TRPH. The reported TRPH concentrations of 530 parts per million (ppm) exceeded the FDER regulatory standard of 50 ppm for petroleum contaminated soils (FDER, May 1992) and, therefore, warranted further site investigation pursuant to Chapter 17-770, FAC.

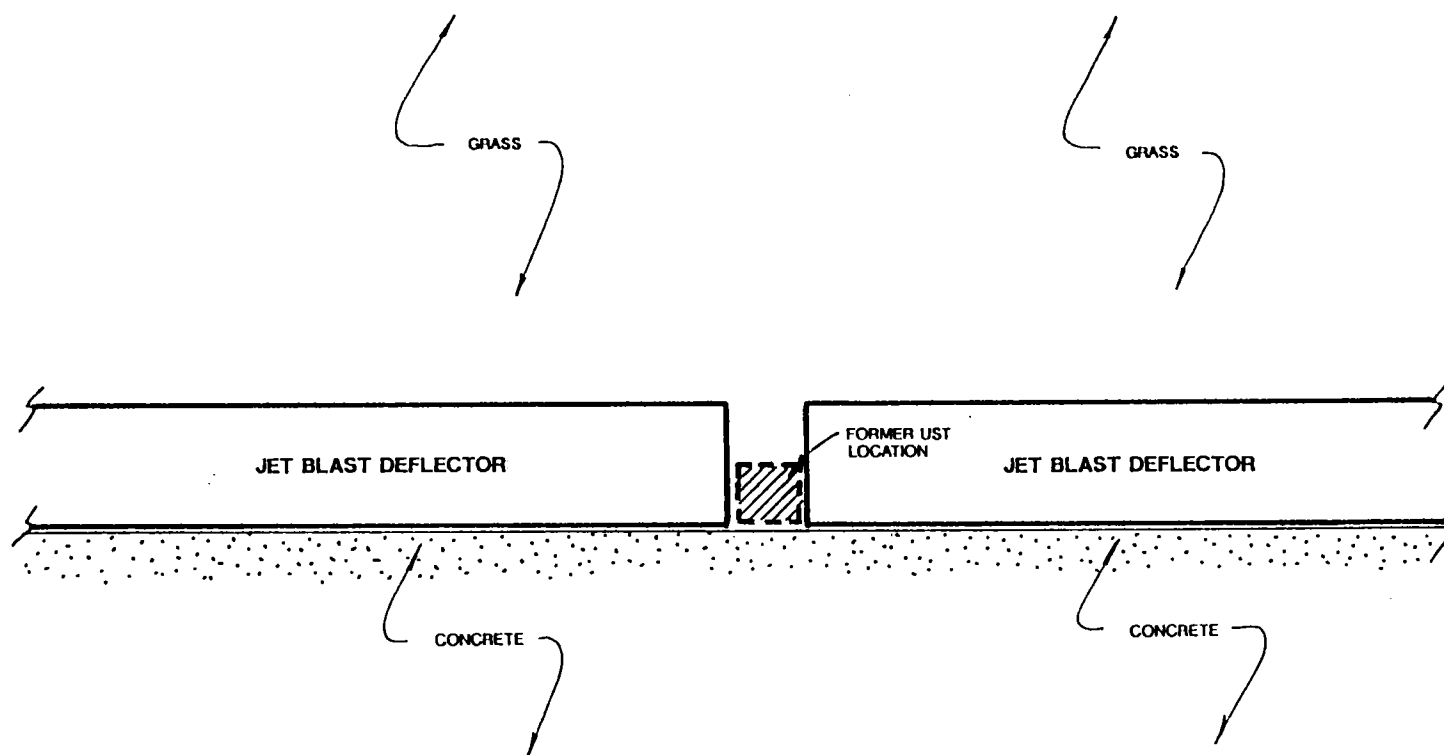


FIGURE 2-2
SITE PLAN



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3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix A. Surface elevations at the site are relatively flat and are approximately 25 feet above mean sea level (msl).

3.2 HYDROGEOLOGY.

3.2.1 Regional and Local The Pensacola area is underlain by three water bearing zones. These zones, in order of increasing depth, are the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer. A detailed discussion of these three aquifers is presented in Appendix A.

3.2.2 Site Specific The principal aquifer of concern at the site is the surficial zone of the sand-and-gravel aquifer. The surficial zone was penetrated to a depth of 17 feet below land surface (bls) during this investigation. The surficial zone is unconfined, and the water table was encountered at a depth of approximately 5 feet bls during this investigation. Site-specific aquifer characteristics and other hydrogeologic parameters are discussed in Section 5.1.

Surficial and subsurface soils are generally composed of very fine-grained to fine-grained quartz sands. The sands vary in color from orange-brown to light-brown to white. Peat was encountered at the bottom of all of the soil borings, at depths of 16 to 17 feet bls. Complete lithologic logs for all site soil borings and monitoring wells are presented in Appendix B.

4.0 METHODOLOGIES AND EQUIPMENT

4.1 SOIL BORING AND SOIL SAMPLING PROGRAM. Six soil borings, SB1 through SB6, were drilled at the site to assess the extent and levels of soil petroleum contamination, to identify the type of subsurface material, and to aid in the placement of subsequent groundwater monitoring wells. Soil boring locations are shown in Figure 4-1. Composite soil samples collected from split-spoon standard penetration tests (SPTs) were analyzed for petroleum constituents with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). The results of the soil boring program and soil sampling program are discussed in Section 5.2.

4.2 MONITORING WELL INSTALLATION PROGRAM. One 2-inch inside diameter (ID), shallow, permanent monitoring well (PEN-3221NW-MW1), and four 2-inch ID temporary wells (PEN-3221NW-PZ1 through PEN-3221NW-PZ4) were installed at the site. An additional temporary well, PEN-3221NW-PZ5, was installed west of the site to aid in the delineation of groundwater flow direction. These wells are designated as MW1 and PZ1 through PZ5 on figures and tables in this report. Wells were screened in the upper portion of the surficial zone, at depths of 5 to 15 feet bbs. Well locations are shown in Figure 4-1. Monitoring well construction methodologies and materials are discussed in Appendix C.

4.3 GROUNDWATER ELEVATION SURVEY. The elevation and slope of the water table were determined by surveying the top of the well casing for each monitoring well to a common reference datum using a surveyor's level and stadia rod. Elevations were referenced to a benchmark located on a culvert near the southwest corner of Building 3221. This benchmark is part of the U.S. Coastal and Geodetic Survey benchmarking system and has an elevation of 27.46 feet above the National Geodetic Vertical Datum (NGVD) of 1929.

Groundwater level measurements were collected on January 13 and February 4, 1992. Procedures for groundwater level measurements are contained in Appendix C.

4.4 GROUNDWATER SAMPLING PROGRAM. Groundwater samples were collected from wells PEN-3221NW-MW1 and PEN-3221NW-PZ1 through PEN-3221NW-PZ4, on February 4, 1992. Temporary well PEN-3221NW-PZ5 was not sampled. A duplicate sample was collected from well PEN-3221NW-MW1. The samples were sent to Wadsworth/Alert Laboratories in Tampa, Florida, for analysis. A laboratory blank, equipment blank, and trip blank were also analyzed. Procedures for collection of groundwater samples are presented in Appendix C.

4.5 AQUIFER SLUG TESTS. Three rising head slug tests were performed in monitoring well PEN-3221NW-MW1 to assess the hydraulic conductivity of the surficial zone of the sand-and-gravel aquifer. Procedures for conducting slug tests are included in Appendix C. Slug test data graphs and calculations are attached in Appendix D.

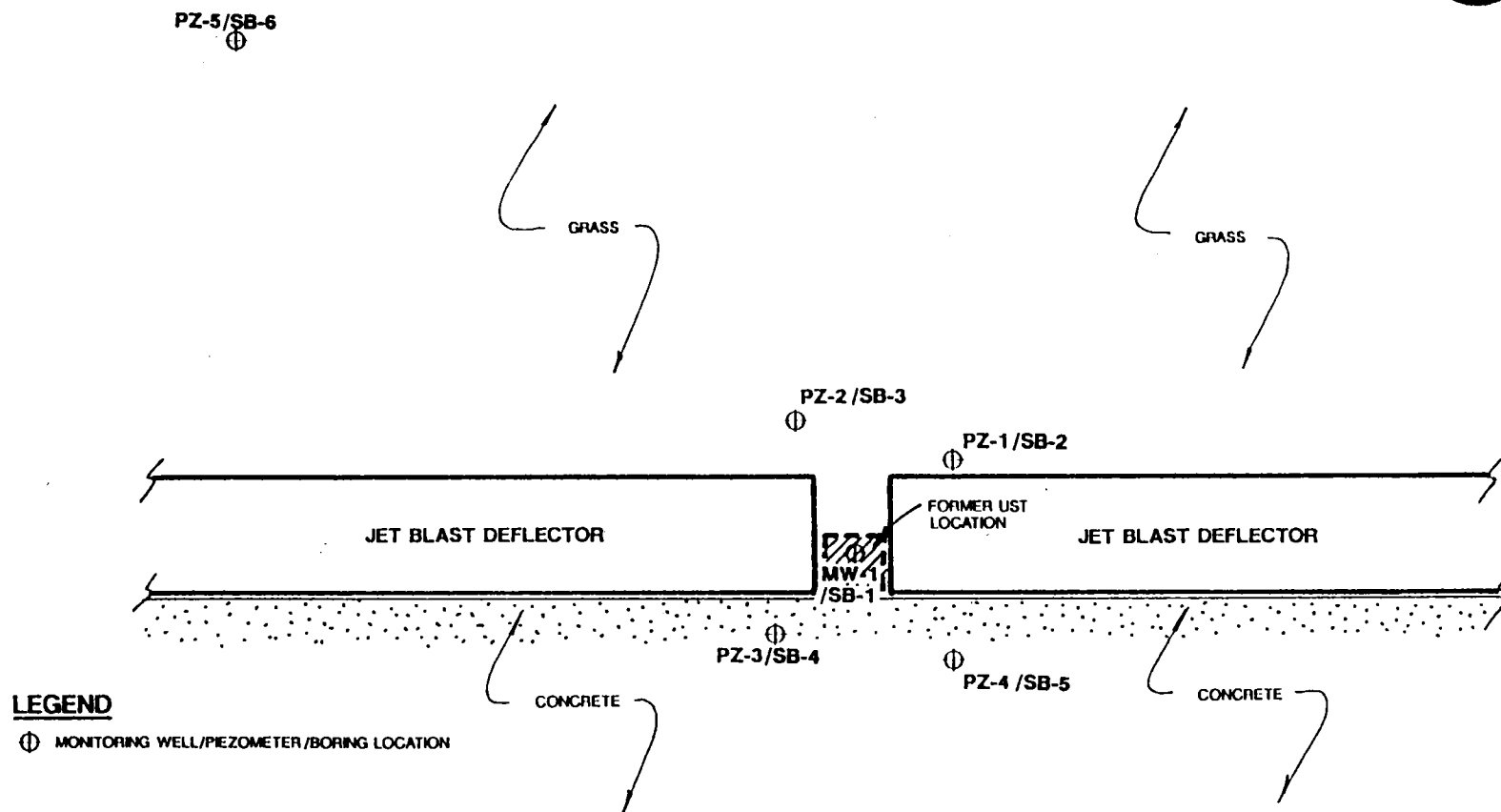


FIGURE 4-1
MONITORING WELL AND SOIL
BORING LOCATIONS



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5.0 CONTAMINATION ASSESSMENT RESULTS

5.1 SITE-SPECIFIC AQUIFER CHARACTERISTICS AND HYDROGEOLOGIC PARAMETERS. The surficial zone of the sand-and-gravel aquifer is the primary interval of concern at the site. The surficial zone is unconfined, and the water table was encountered at a depth of approximately 5 feet bls.

Groundwater level measurements in site monitoring wells were collected on January 13 and February 4, 1992. These measurements are shown in Table 5-1 and were used to construct water table elevation contour maps to delineate the direction of groundwater flow at the site. Water table elevation contour maps for the January 13 and February 4, 1992, measurements are shown in Figures 5-1 and 5-2, respectively. Both maps indicate an easterly flow direction in the surficial zone.

Table 5-1
Top of Casing and Groundwater Elevations,
January 13 and February 4, 1992

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Well Number	January 13, 1992			February 4, 1992		
	TOC	DTW	Groundwater Elevation	TOC	DTW	Groundwater Elevation
MW1	24.34	5.25	19.09	24.34	5.07	19.27
PZ1	28.04	8.93	19.11	28.04	8.75	19.29
PZ2	28.25	9.14	19.11	28.25	8.96	19.29
PZ3	27.45	8.38	19.07	27.45	8.19	19.26
PZ4	27.45	8.38	19.07	27.45	8.19	19.26
PZ5	30.93	11.80	19.13	30.93	NM	NM

Notes: TOC = top of casing.
DTW = depth to water.
NM = not measured.

The average hydraulic gradient across the site is 1.3×10^{-3} feet per foot (ft/ft). Slug tests results indicate an average horizontal hydraulic conductivity (K) of 5.9×10^1 feet per day (ft/day). The calculated pore water velocity (V) is 3.1×10^{-1} ft/day. Equations and calculations used to determine these values are presented in Appendix D.

NOTE:

PIEZOMETER ELEVATIONS CORRECTED FOR STICKUP HEIGHT USING
1/3/92 SURVEY DATA. 3/12/92 SURVEY DATA DETERMINED LOCATION
AND GROUND SURFACE ELEVATION ONLY.

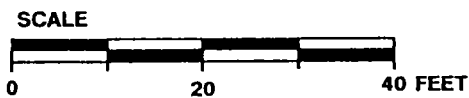
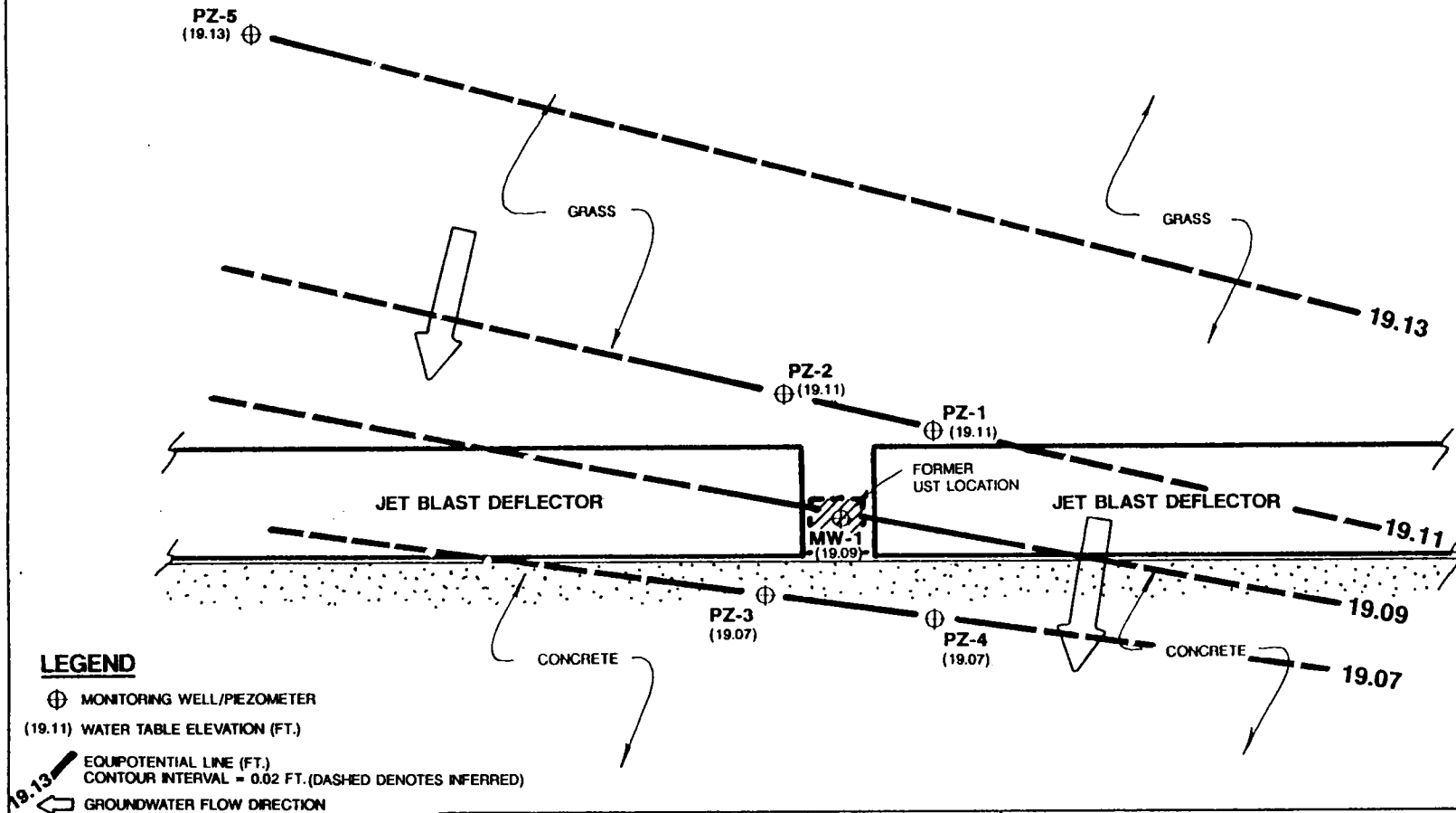


FIGURE 5-1
WATER TABLE ELEVATION CONTOUR MAP
SURFICIAL ZONE -
SAND-AND-GRAVEL AQUIFER,
JANUARY 13, 1992



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NOTE:

PIEZOMETER ELEVATIONS CORRECTED FOR STICKUP HEIGHT USING
1/3/92 SURVEY DATA. 3/12/92 SURVEY DATA DETERMINED LOCATION
AND GROUND SURFACE ELEVATION ONLY.

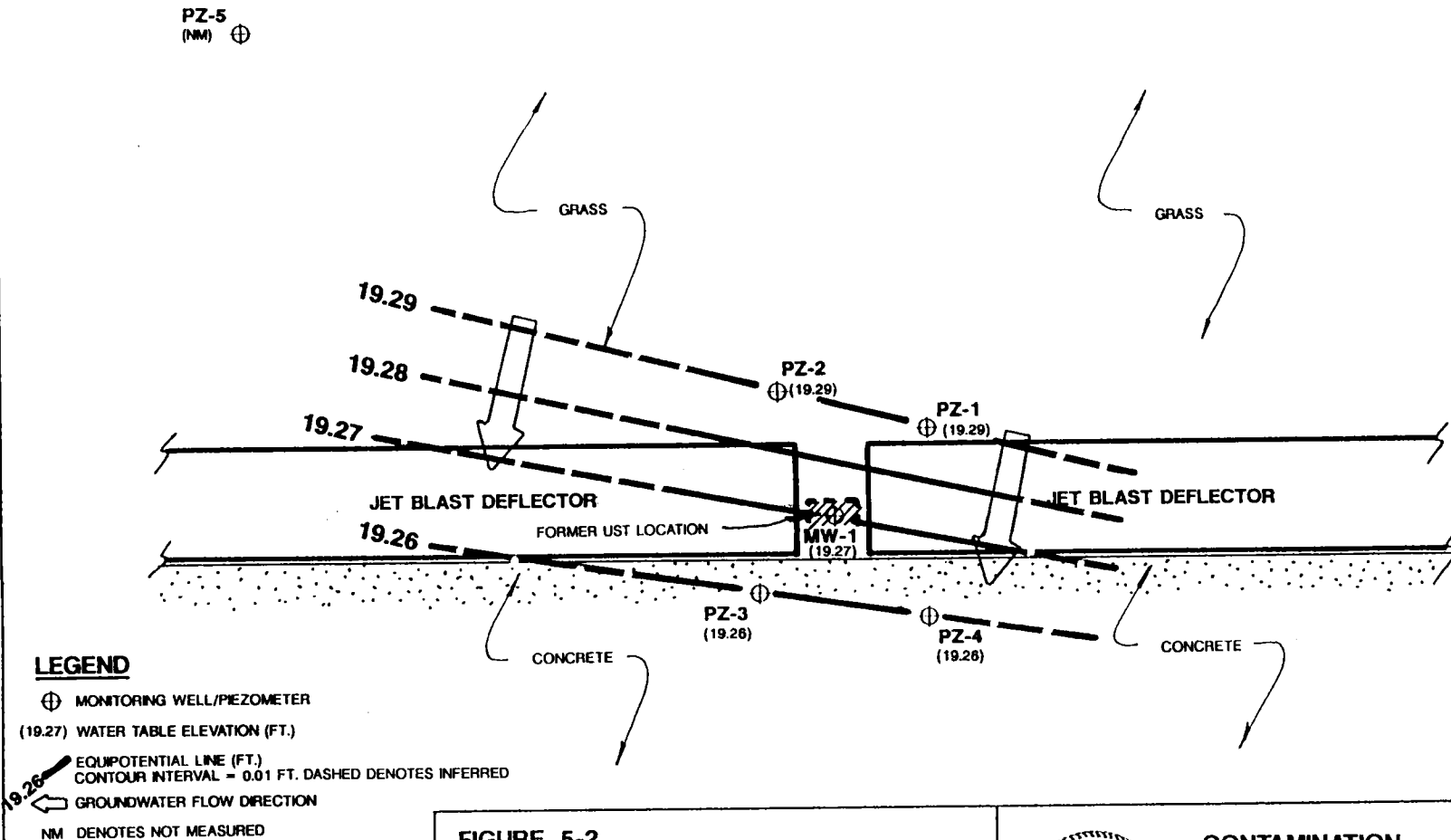


FIGURE 5-2
WATER TABLE ELEVATION CONTOUR MAP
SURFICIAL ZONE -
SAND-AND-GRAVEL AQUIFER,
FEBRUARY 4, 1992



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5.2 CONTAMINANT PLUME DEFINITION AND CHARACTERIZATION.

5.2.1 Soil Contamination Composite soil samples were collected from SPT samples from January 7 through January 13, 1992, at depths of 5 to 7 feet bls, and were analyzed by OVA headspace techniques. A summary of the OVA analyses is presented in Table 5-2. No volatile organic compounds (VOC) were detected in four of the soil borings. The sample from SB3/PZ2 had a VOC concentration of only 2 ppm, which is well below the State allowable concentration of 10 ppm. No discoloration or petroleum odors were observed in any of the soil samples. The sample results indicate that petroleum soil contamination at the site is not significant.

Table 5-2
Summary of Soil Sample Organic Vapor Analyzer (OVA) Headspace Analyses,
January 7 through January 13, 1992

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Pensacola, Florida

Boring Designation	Depth (feet)	Concentration ¹ (ppm)	Comments
SB1/MW1	5 to 7	0	No odor and no discoloration
SB2/PZ1	5 to 7	0	No odor and no discoloration
SB3/PZ2	5 to 7	2	No odor and no discoloration
SB4/PZ3	5 to 7	0	No odor and no discoloration
SB5/PZ4	5 to 7	0	No odor and no discoloration
SB6/PZ5	NS	NM	

¹ Corrected for methane

Note: ppm = parts per million

NS = not sampled

NM = not measured

5.2.2 Groundwater Assessment In some areas near NAS Pensacola, the surficial zone of the sand-and-gravel aquifer has been demonstrated to be hydraulically connected with the main producing zone of the sand-and-gravel aquifer, making potable water supplies susceptible to contamination in these areas (Roaza and others, 1991). For this reason, the surficial zone at NAS Pensacola will be herein treated as a Class G-II water source, and Class G-II State regulatory standards will be applied throughout this report.

Groundwater samples were collected from site monitoring wells on February 4, 1992. Samples were submitted to Wadsworth/Alert Laboratories in Tampa, Florida, for VOC analysis by U.S. Environmental Protection Agency (USEPA) Methods 601 and 602, for polyaromatic hydrocarbons analysis by USEPA Method 610, for ethylene dibromide (EDB) analysis, for TRPH analysis, and for lead analysis. These

analyses were performed for constituents of the kerosene analytical group as outlined in Chapter 17-770, FAC.

Laboratory analyses identified chloroform, toluene, and TRPH as the only groundwater contaminants at the site. None of the reported concentrations for these contaminants exceeded State regulatory standards. Table 5-3 summarizes the groundwater sample analyses, and Figure 5-3 shows the distribution of groundwater contaminants at the site.

Table 5-3
Summary of Groundwater Sample Laboratory Analyses,
February 4, 1992

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Pensacola, Florida

Compound	State Regula- tory Level	MW1	MW1 Duplicate	PZ1	PZ2	PZ3	PZ4	Equip- ment Blank	Trip Blank	Lab Blank
Chloroform	100	2	3	3	3	2	3	ND	ND	ND
Toluene		1	ND	ND	ND	ND	7	ND	5	ND
Total VOA	50	1	ND	ND	ND	ND	ND	ND	ND	ND
TRPH	5	4	5	ND	ND	ND	ND	ND	NA	ND

Notes: Duplicate sample collected from MW1.

All concentrations are in parts per billion, except TRPH, which is in parts per million.

No sample was collected from PZ5.

ND = not detected.

NA = not analyzed.

Total VOA = Total volatile organic aromatics; the sum of benzene, ethyl benzene, toluene, and xylenes.

TRPH = total recoverable petroleum hydrocarbons.

5.3 POTABLE WELL SURVEY. A potable well survey was conducted to assess the risk of contamination to potable water sources from activities at Site 3221NW. Two potable supply wells (designated as Well No. 1 and Well No 2, in Figure 5-4) exist at NAS Pensacola (Wilkins and others, 1985). The NAS Pensacola water supply system is used in conjunction with the Corry Field water supply system, which is located approximately 2 miles north of NAS Pensacola. According to NADEP personnel, these wells are not currently used for potable water supplies at NAS Pensacola, but are available as reserve potable water supplies should the need arise.

Potable well inventory data are presented in Table 5-4. Both wells at NAS Pensacola are screened in the main producing zone of the sand-and-gravel aquifer at depths ranging from 105 to 160 feet bls. No well is located within a 0.25 mile radius of the site. Therefore, the possibility of contamination of potable water sources from activities at Site 3221NW does not appear feasible.



NOT SAMPLED

PZ-5/SB-6



GRASS

CHLOROFORM 3

PZ-2/SB-3



CHLOROFORM 3

PZ-1/SB-2



JET BLAST DEFLECTOR

CHLOROFORM 2
TOLUENE 1
TRPH 4

MW-1
/SB-1

FORMER UST
LOCATION

JET BLAST DEFLECTOR

PZ-3/SB-4

CHLOROFORM 2

PZ-4/SB-5

CHLOROFORM 3
TOLUENE 7

CONCRETE

LEGEND



MONITORING WELL/PIEZOMETER/BORING LOCATION



CONCENTRATION (ppb)

TRPH Reported in ppm and DENOTES TOTAL
RECOVERABLE PETROLEUM HYDROCARBONS

SCALE

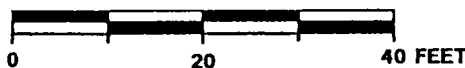
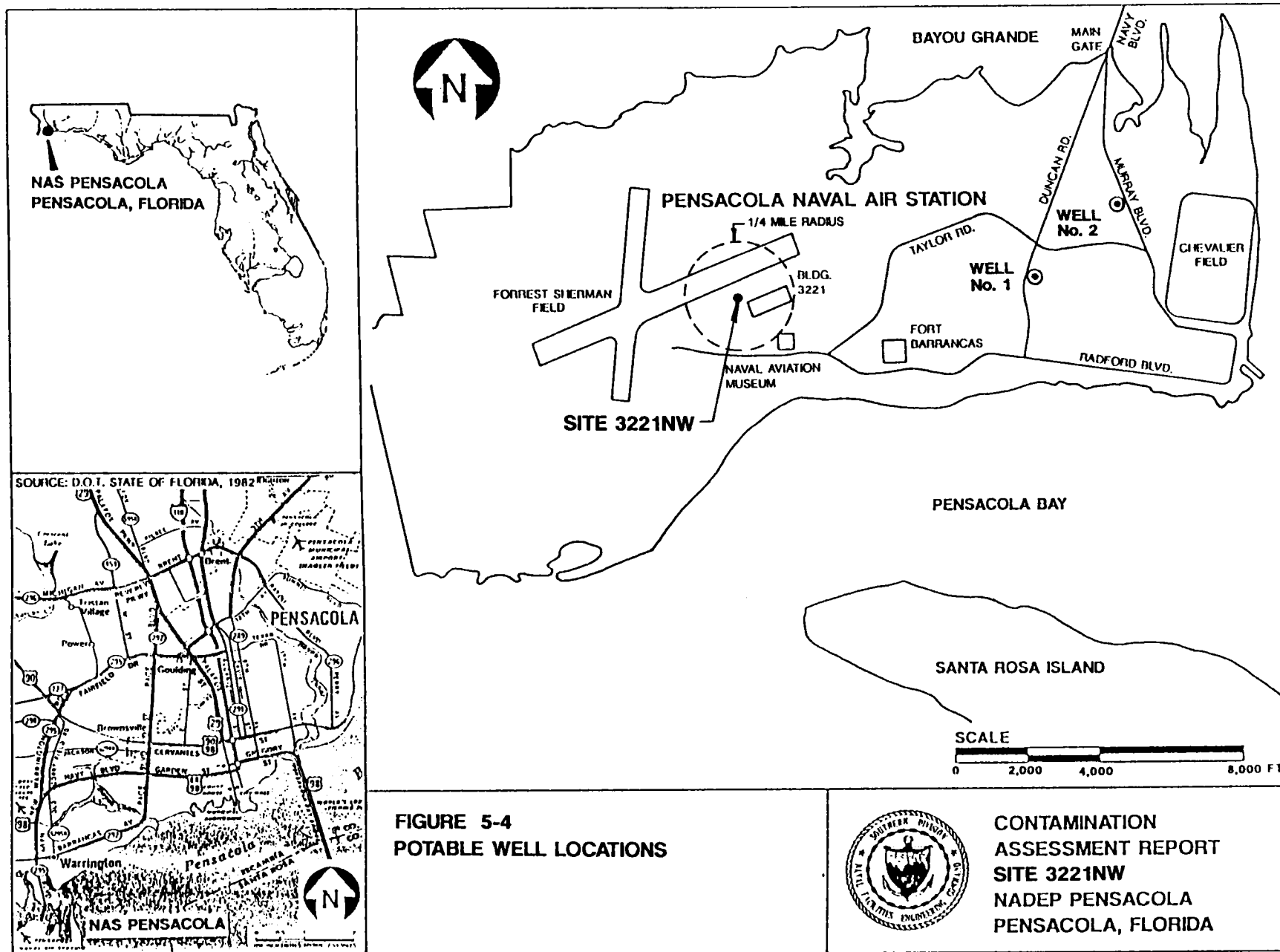


FIGURE 5-3
GROUNDWATER CONTAMINATION
DISTRIBUTION MAP
FEBRUARY 4, 1992



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NW
NADEP PENSACOLA
PENSACOLA, FLORIDA



**FIGURE 5-4
POTABLE WELL LOCATIONS**



**CONTAMINATION
ASSESSMENT REPORT
SITE 3221NW
NADEP PENSACOLA
PENSACOLA, FLORIDA**

Table 5-4
Potable Well Inventory Data,
Naval Air Station, Pensacola Florida

Contamination Assessment Report
 Site 3221NW, Naval Aviation Depot
 Pensacola, Florida

Well Identification Number/Local Name	Location	Total Depth (feet)	Screened Interval (feet)	Diameter Casing/Screen (inches)
302116087170201/No. 1	Sec. 1,T3S,R30W Duncan and Taylor Roads	174	105-160	24/12
302124087163601/No. 2	Sec. 1,T3S,R30W Murray and Farrar Roads	178	110-160	24/12

6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY. Based on the results of the field investigations and the laboratory analytical results collected during this investigation, the following is a summary of conditions at the site.

- The sediments encountered during drilling operations are generally comprised of very fine-grained to fine-grained quartz sands. These sediments are part of the surficial zone of the sand-and-gravel aquifer (Roaza and others, 1991).
- Groundwater beneath the site was encountered at depths of approximately 5 feet bls and is classified as G-II.
- The direction of groundwater flow in the surficial zone is to the east.
- The average hydraulic gradient across the site is 1.3×10^{-3} ft/ft.
- The average hydraulic conductivity at the site is 5.9×10^{-1} ft/day.
- The average pore water velocity is 3.1×10^{-1} ft/day.
- OVA headspace analyses indicated minimal petroleum contamination in soils at the site.
- Groundwater contaminants identified at the site were chloroform, toluene, and TRPH. None exceeded State regulatory standards.
- The source of this contamination (the JP-5 UST) has been removed from the site.
- Because no potable water sources were identified within a 0.25-mile radius of the site, there appears to be little chance for contamination of the public water supply system from activities at the site.

6.2 CONCLUSIONS. The level of soil and groundwater contamination identified at Site 3221NW is minimal, does not exceed State regulatory standards, and is not expected to impact potable water supplies on the base.

6.3 RECOMMENDATIONS. Based on the findings and interpretations of this contamination assessment, a *No Further Action Proposal (NFAP)* is herewith submitted for Site 3221NW.

7.0 PROFESSIONAL REVIEW CERTIFICATION

The contamination assessment contained in this report was prepared using sound hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report was developed for the UST located at Site 3221NW at the Naval Aviation Depot, Naval Air Station, Pensacola, Florida, and should not be construed to apply to any other site.

Roger Durham
Professional Geologist
P.G. No. 001127

Date

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APPENDIX A
SITE CONDITIONS

Regional and Local Physiography

Florida is divided into four physiographic zones; the Coastal Lowlands, the Central Highlands, the Northern Highlands, and the Marianna Lowlands (Puri and Vernon, 1964). The Pensacola area lies entirely within the Coastal Lowlands zone, which closely parallels the Florida coastline. The Coastal Lowlands are further divided into the Atlantic, Distal, and Gulf Coastal Lowlands (Puri and Vernon, 1964). The Naval Aviation Depot (NADEP) Pensacola falls within the Gulf Coastal Lowlands. The lowlands are characterized by poor drainage and elevations less than 100 feet above mean sea level. Landforms include barrier islands, estuaries, coastal ridges, dunes, and valleys (Puri and Vernon, 1964).

Land surface altitudes at NADEP Pensacola range from sea level at the coast to greater than 30 feet above sea level. Surface drainage is variable, but is generally toward the nearest body of water.

Regional Hydrogeology

NADEP Pensacola is underlain by three water bearing zones. These zones include the sand-and-gravel aquifer, the Upper Floridan Aquifer, and the Lower Floridan Aquifer.

The sand-and-gravel aquifer is comprised of Pleistocene terrace deposits, the Pliocene Citronelle Formation (Marsh, 1966), and Miocene coarse clastics. These deposits extend from the surface to a depth of approximately 400 feet below land surface (bls) and are predominantly poorly sorted, fine-grained to coarse-grained sands interbedded with numerous layers of clay and gravel (up to 60 feet thick). There is great lithologic variability in these deposits. Clay lenses and the presence of hardpan layers within the sand-and-gravel aquifer result in the occurrence of perched water tables and artesian conditions in some areas (Musgrove and others, 1965). Groundwater flow is generally topographically controlled. Recharge to the aquifer is derived almost entirely from local rainfall. The sand-and-gravel aquifer is the sole source of potable groundwater in the Pensacola area (Roaza and others, 1991).

The sand-and-gravel aquifer is divided into three major zones: the surficial zone, the low permeability zone, and the main producing zone (Roaza and others, 1991). These designations are based on changes in permeability of the sediments comprising each zone. The surficial zone is the uppermost layer of the aquifer. It consists primarily of sand and gravel with occasional silt and clay deposits. This zone ranges in thickness from 0 to 150 feet (Roaza and others, 1991). The low permeability zone, which underlies the surficial zone, consists of various mixtures of clay, silt, sand, and gravel. Locally, this zone contains poorly sorted sands, with gravel and some clay (Roaza and others, 1991). The thickness of the zone varies from 50 to 100 feet. Individual beds of the low permeability zone are highly discontinuous, and in some areas there may be hydraulic connection between the surficial zone and the main producing zone. The main producing zone is composed of moderate to well sorted sand-and-gravel beds that are typically interbedded with beds of fine-grained sand and clay. Locally, this zone typically contains medium-grained sands and sandy clays (Roaza and others, 1991). The thickness of the main producing zone ranges from 200 to 300 feet.

The Upper Floridan Aquifer is comprised of deposits correlative to the lower Miocene Tampa Formation and the upper Oligocene Chickasawhay Formation. These two formations are undifferentiated in the Pensacola area. Locally these deposits are approximately 380 feet thick (Marsh, 1966) and are typically brown to light gray, hard, fossiliferous dolomitic limestones or dolomites with a distinctive spongy-looking texture. Locally, the overlying Pensacola Clay is approximately 1,000 feet thick and forms an effective confining unit between the sand-and-gravel aquifer and the Upper Floridan aquifer (Marsh, 1966). This confining unit has also been designated as part of the Intermediate System (Roaza and others, 1991). The Upper Floridan aquifer is recharged by local rainfall in Conecuh, Escambia, and Monroe Counties, Alabama (Healy, 1980). General groundwater flow in the Upper Floridan aquifer is to the southeast toward the Gulf of Mexico (Barr, 1987). The groundwater in the Upper Floridan aquifer is mineralized in this area and is not used as a water supply.

The Lower Floridan aquifer is comprised of upper to middle Eocene limestones. The aquifer is approximately 500 feet thick in the vicinity (Marsh, 1966). The limestones are typically white to grayish cream, soft, and chalky. The Lower Floridan aquifer is confined from above by the Bucatunna Clay Member of the middle Oligocene Byram Formation and from below by gray shales and clays of middle Eocene age. The Bucatunna Clay, also called the Intermediate Zone, is approximately 170 feet thick in the vicinity (Musgrove and others, 1965). Groundwater flow in the aquifer is to the southeast toward the Gulf of Mexico (Healy, 1980). The water quality is poor because of high mineralization.

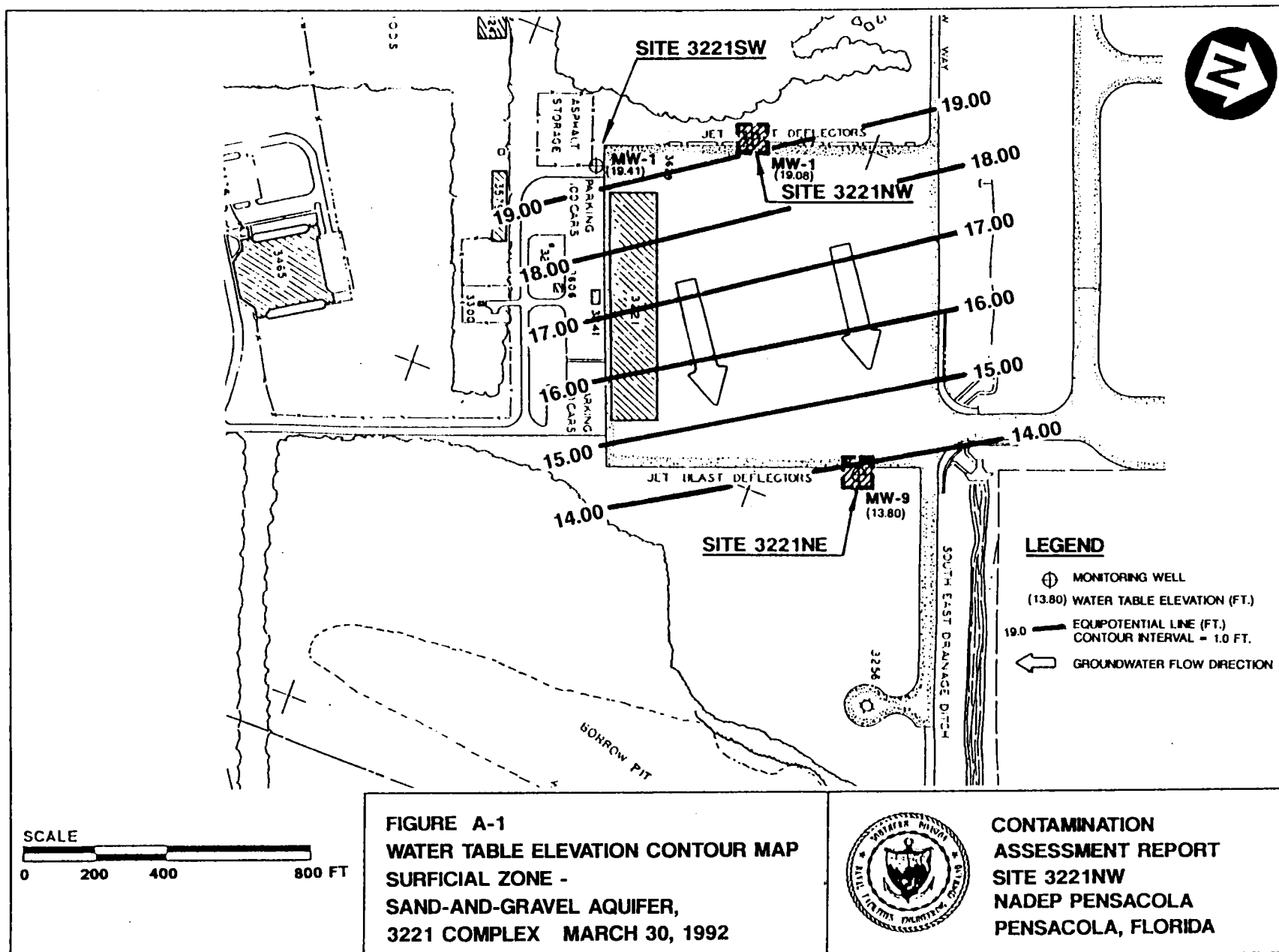
Local Hydrogeology

The surficial zone of the sand-and-gravel aquifer is the interval of primary concern at NAS Pensacola. The surficial zone extends from the surface to a depth of approximately 100 feet bls. Soils from 0 to 50 feet bls are generally composed of fine- to very fine-grained sands, with very little silt and clay. Occasional coarse-grained sands to fine-grained gravels were found with the fine- to very fine-grained sands, and thin peat layers were found at NAS Pensacola in the Sherman Field vicinity.

Groundwater in the surficial zone is non-artesian and is encountered at depths from less than 2 feet bls to greater than 20 feet bls at the NADEP facility. The depth to groundwater is mainly controlled by topography. Recharge is predominantly from local rainfall.

Figure A-1 shows the groundwater flow direction in the site vicinity on March 30, 1992, based on measurements taken from three monitoring wells at Sites 3221NE, 3221NW, and 3221SW. The direction of groundwater flow in the Building 3221 vicinity appears to be to the east. Perched water tables were observed at the Site 3221NE and are apparently the result of the presence of peat layers.

Locally, hydraulic gradients in the surficial zone vary from approximately 1×10^{-3} feet per foot (ft/ft) to 7×10^{-3} ft/ft. Gradients are generally less in the lower flat-lying areas than those in the topographically higher areas. Water level measurements, taken on numerous occasions at low-elevation sites located near Pensacola Bay, indicate that tidal fluctuations do not appear to alter the groundwater flow direction and do not appear to significantly affect the hydraulic gradients observed at NAS Pensacola.



APPENDIX B
LITHOLOGIC LOGS

TITLE: NADEP Pensacola		LOG of WELL: 3221NW MW1	BORING NO. SBI
CLIENT: SOUTHNAVFACENGCOM			PROJECT NO: 7527-30
CONTRACTOR: Groundwater Protection Inc./Orlando, FL		DATE STARTED: 1/7/92	COMPLTD: 1/7/92
METHOD: 4.25" ID HSA	CASE SIZE: 2 inch	SCREEN INT: 10'	PROTECTION LEVEL: D
TOC ELEV.: 24.34 FT.	MONITOR INST: Porta Fid	TOT DPTH: 14FT.	DPTH TO ∇ 5.07 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 1/8/92		SITE: NADEP Pensacola

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0			0	CLAYEY SAND: Orange red, very fine to fine grained.		SP	-PH-	
5		1.8/2	0	SAND: Off-white to orange-brown, very fine to fine grained, wet.		SP	2,2,2,4	
10		1.2/2	0	SAND: Orange-brown to white, very fine to fine grained.		SP	3,3,8,11	
15		0.8/2	8	SAND W/ PEAT: Brown, fine grained, wet, sand underlain by dark brown peaty layer with distinct organic odor.		SP	4,8,10,12	
						PT		
20								
25								

TITLE: NADEP Pensacola		LOG of WELL: 322INW PZ-1		BORING NO. SB2	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL			DATE STARTED: 1/7/92		COMPLTD: 1/7/92
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch	SCREEN INT.: 10'	PROTECTION LEVEL: D	
TOC ELEV.: 24.78 FT.		MONITOR INST.: Porta Fid	TOT DPTH: 15FT.	DPTH TO ∇ 5.74 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/11/92		SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY SAMPLE	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0			0	SAND: Orange-tan to brown-gray, very fine to fine grained.		SP	-PH-	
5			1.0/2	SAND: Orange-brown to off-white, very fine to fine grained, damp.		SP	2,3,3,4	
10			1.4/2	SAND: Off-white to light brown, very fine to fine grained.		SP	7,8,5,8	
15			1.9/2	SAND: Off-white, very fine to fine grained, wet.		SP	5,13,18,10	
				PEAT: Peat-like layer at bottom 7 cm. of core.		PT		
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 3221NW PZ-2		BORING NO. SB3	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/8/92		COMPLTD: 1/8/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 10'		PROTECTION LEVEL: D	
TOC ELEV.: 25.00 FT.		MONITOR INST.: Porta Fld		TOT DPTH: 17FT.		DPTH TO ∇ 5.98 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/11/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
			NA	SAND: Orange-tan, very fine to fine grained.		SP	-PH-	
5		1.5/2	7	SAND: White to off-white, very fine to fine grained, wet.		SP	2,3,5,5	
10		1.8/2	NA	SAND: As above.		SP	3,4,3,4	
15		2.0/2	10	SAND: As above.		SP	11,5,3,7	
				PEAT: Dark brown, oily, organic odor, fine dark brown sand layer at bottom of core.		PT		
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 3221NW PZ-3		BORING NO. SE4	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/8/92		COMPLTD: 1/8/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 10'		PROTECTION LEVEL: D	
TOC ELEV.: 24.78 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 17FT.		DPTH TO ∇ 5.18 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/8-IN	WELL DATA
			NA	SAND: 011-white, very fine to fine grained.		SP	-PH-	
5		1.3/2	5	SAND: 011-white to light tan, very fine to fine grained, moist.		SP	3,3,2,3	
10		1.8/2	0	SAND: 011-white, very fine to fine grained, some black specks, wet.		SP	4,5,5,4	
15		2.0/2	0	SAND: 011-white, fine to medium grained.		SP	8,8,10,11	
				PEAT: Dark brown, mixed with fine grained brown sand, organic odor.		PT		
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 3221NW PZ-4		BORING NO. SB5	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/8/92		COMPLTD: 1/8/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 10		PROTECTION LEVEL: D	
TOC ELEV.: 24.84 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 17FT.		DPTH TO ∇ 5.19 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0			0	SAND: Yellow-tan, very fine to fine grained.		SP	-PH-	
5		1.2/2	0			SP	3,3,4,4	
10		1.2/2	-	SAND: Off-white to light brown, very fine to fine grained, moist.		SP	5,3,4,3	
15		1.4/2	-	SAND: Off-white, very fine to fine grained, wet.		SP	5,8,11,14	
				SAND W/ PEAT: Brown, very fine to fine grained, sand mixed with dark brown peat, organic odor, wet.		PT		
20								
25								

TITLE: NADEP Pensacola		LOG of WELL: 3221NW PZ-5		BORING NO. SB8	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL			DATE STARTED: 1/13/92		COMPLTD: 1/13/92
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch	SCREEN INT.: 10'	PROTECTION LEVEL: D	
TOC ELEV.: 26.21 FT.		MONITOR INST.: Porta Fid	TOT DPTH: 20.35FT.	DPTH TO ∇ 9.51 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: NA		SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					SAND: Light brown to tan, fine to medium grained.		SP	-PH-	
5					SAND: Light gray, fine to medium grained, damp.		SP	NO SPOONS	
10					SAND: Light gray, fine to medium grained, damp.		SP		
15					SAND: Light gray to white, fine to medium grained, wet.		SP		
20									
25									

APPENDIX C
INVESTIGATIVE METHODOLOGIES AND PROCEDURES

Soil Boring Methods

Boreholes were advanced using 4.25-inch inside diameter, hollow-stem augers using a rotary drill rig. Soil samples were collected from each borehole using a standard penetration test (SPT) split-spoon sampler. SPT samples were generally collected at 5-foot intervals to the total depth of the well. The soil samples collected above the water table were placed in 16-ounce glass jars and head space analyses were performed using an organic vapor analyzer (OVA) with a flame ionization detector (FID) following Florida Department of Environmental Regulation (FDER) Chapter 17-770.200(2), Florida Administrative Code (FAC) guidelines. Samples from below the water table were analyzed using a portable gas chromatograph (GC) calibrated to detect benzene, ethyl benzene, toluene, and xylene (BETX) to the part per billion (ppb) level. The purpose of the screening procedure was to optimize monitoring well placement during the investigation.

Monitoring Well Construction

Monitoring wells were installed in many of the boreholes drilled at the NADEP facility. All monitoring wells installed during the investigation were constructed of 2-inch inner diameter, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 0.010-inch machine-slotted screen. Shallow wells were constructed with 10 feet of screen. Deeper wells were constructed with 5 feet of screen. PVC well casings extend from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 2 to 3 feet above the top of the screen. A 1- to 2-foot thick bentonite seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout. A protective traffic-bearing vault was installed to complete each well location. In concreted areas, the well pad consisted of 6-inch thick reinforced concrete around the traffic-bearing vault to the depth of the surrounding concrete. Each monitoring well is equipped with a locking well cap and a padlock. Figure C-1 depicts a typical shallow monitoring well installation for the site.

Water Level Measurements

The groundwater levels were measured using an electric water level indicator and an engineering tape divided into increments of 0.01 foot. The wells were checked for the presence of free product by visual observation of a groundwater sample taken from each well using an extruded Teflon™ bailer. Water level elevations were calculated by subtracting the measured depth to groundwater from the elevation at the top of the well casing.

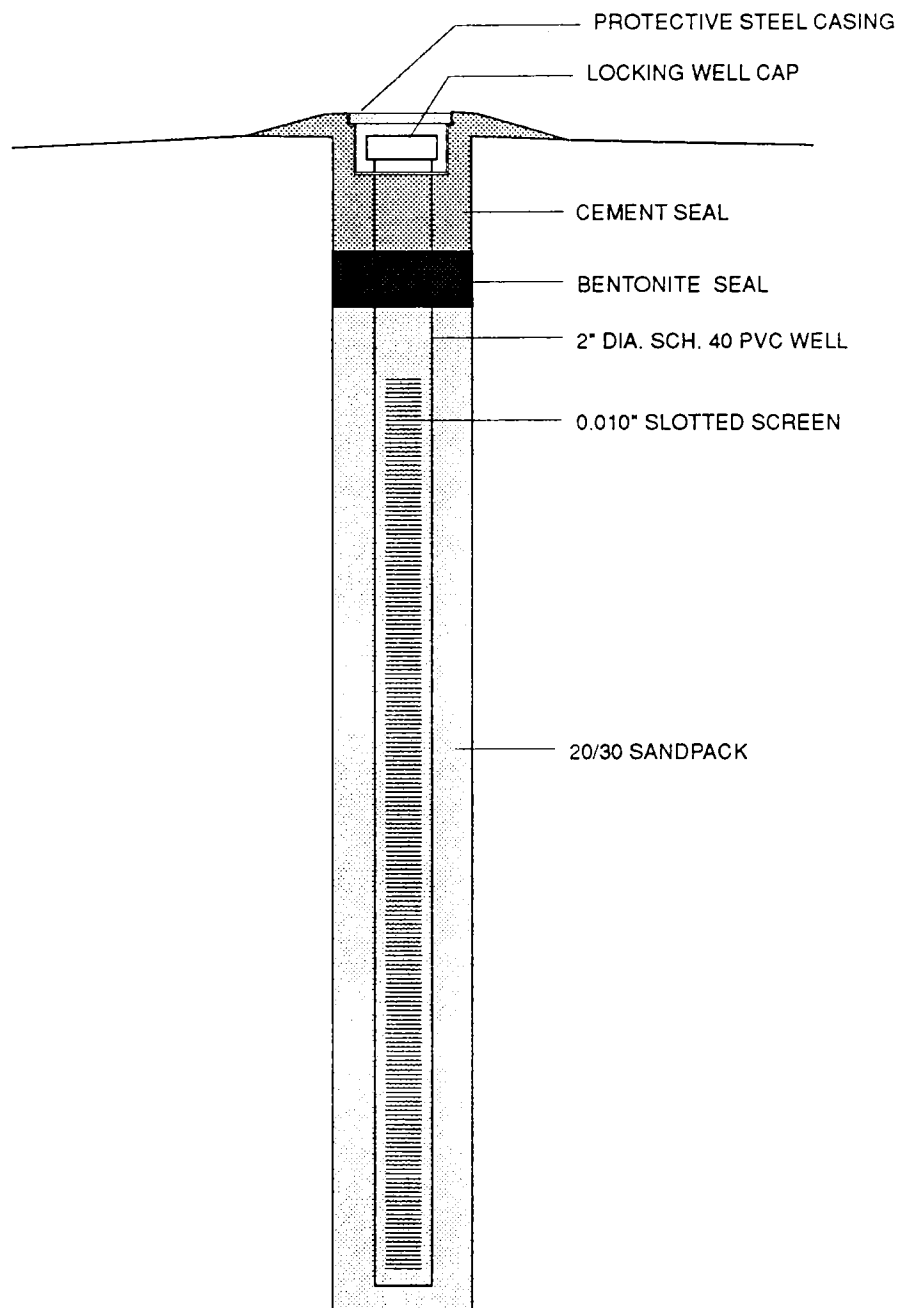


FIGURE C-1
MONITORING WELL
CONSTRUCTION DIAGRAM



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NW
NADEP PENSACOLA
PENSACOLA, FLORIDA

Groundwater Sampling

The groundwater samples were collected in accordance with ABB Environmental Services, Inc. (ABB-ES), Florida Department of Environmental Regulation (FDER)-approved Comprehensive Quality Assurance Plan (CompQAP). The monitoring wells were purged with a Teflon™ bailer. Purging continued until a minimum of three well volumes had been removed from the well. Groundwater samples were collected using an extruded Teflon™ bailer. The samples were placed into appropriate containers, properly preserved, and placed on ice. Samples were then shipped to Wadsworth/Alert Laboratories in Tampa, Florida. All groundwater samples collected were analyzed for constituents of the kerosene analytical group as outlined in FDER Chapter 17-770, Florida Administrative Code (FAC).

Slug Test Procedures

The slug test developed by Bouwer and Rice (1976) permits the measurement of saturated hydraulic conductivity (K) within a single well. The test method used is known as a rising head test and is performed by quickly withdrawing a volume of water (slug) from the well and measuring the subsequent rate of rise of the water level in the well. Bouwer (1989) recommends the rising head slug test for wells with screened intervals that are only partially submerged into unconfined aquifers.

The slug was constructed of 1-inch outside diameter polyvinyl chloride (PVC) pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells were recorded with a data logger and pressure transducer. The pressure transducer was suspended just above the bottom of the well and an initial water level was recorded prior to beginning the test. The slug was then lowered into the well until it was totally submerged beneath the water table. Water levels were then observed until recovery to the original level. Generally, recovery occurred within 3 to 4 seconds. Following stabilization, the slug was quickly removed with water level measurements recorded over time until the water level returned to the original level. Three rising head tests were conducted for each well in order to obtain an average recovery response.

APPENDIX D

AQUIFER PARAMETER CALCULATIONS

Aquifer Parameter Calculations

Hydraulic gradient

Water table elevations were plotted on a scaled water table contour map where flow lines (depicting groundwater flow direction) were drawn perpendicular to the groundwater elevation contours. The groundwater hydraulic gradient was calculated by subtracting the differences in groundwater elevation (in feet) between two points on the map and dividing the elevation difference by the distance between two points to obtain a resulting gradient in feet per foot. Water elevation data collected on January 13 and February 4, 1992, were used to calculate hydraulic gradients at the site. For each date, three traverses were made perpendicular to equipotential contour lines to calculate an average site hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = \frac{(h_1 - h_2)}{d} \quad (1)$$

where

- i = hydraulic gradient (feet per foot [ft/ft]),
- h_1 = water table elevation, upgradient (feet),
- h_2 = water table elevation, downgradient (feet), and
- d = horizontal distance (feet) between h_1 and h_2 along a flow line.

Hydraulic gradients calculated in this manner varied from 1.2×10^{-3} ft/ft to 1.4×10^{-3} ft/ft. The average hydraulic gradient at the site was calculated to be 1.3×10^{-3} ft/ft.

Hydraulic conductivity

Hydraulic conductivity from data gathered in the slug tests was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information was needed to assess the hydraulic conductivity:

- radius of well casing (r_c),
- radius of borehole, $r_w = r_c$ plus thickness of the sand pack surrounding the well screen),
- length of screened interval below the water table (L_e),
- effective well radius (r_e),
- depth of well below the water table (L_w),

- depth to confining unit or bottom of aquifer below the static water table (H), and
- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure D-1 is a well diagram depicting many of the above listed parameters. Calculations were made assuming that $L_w < H$. Hydraulic conductivity, K, was calculated from the above parameters as follows:

$$K = [R_c^2 \ln(\frac{r_e}{r_w}) - 2L_w] [\frac{1}{t} \ln(\frac{y_0}{y_t})] \quad (2)$$

where,

y_0 = y at time zero, and

y_t = y at time t.

The effective well radius, r_e , and the term $((1/t) \ln (y_0/y_t))$ were derived by using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is used to calculate the hydraulic conductivity, K.

Three slug tests each were performed inside well PEN-3221NW-MW1. Hydraulic conductivity, K, is reported in feet per minute (ft/min) on the slug test graphs, and was recalculated to feet per day (ft/day). K was found to vary from 5.7×10^1 ft/day to 6.1×10^1 ft/day with an average K of 5.9×10^1 ft/day.

Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

$$V = \frac{(K \cdot i)}{n} \quad (3)$$

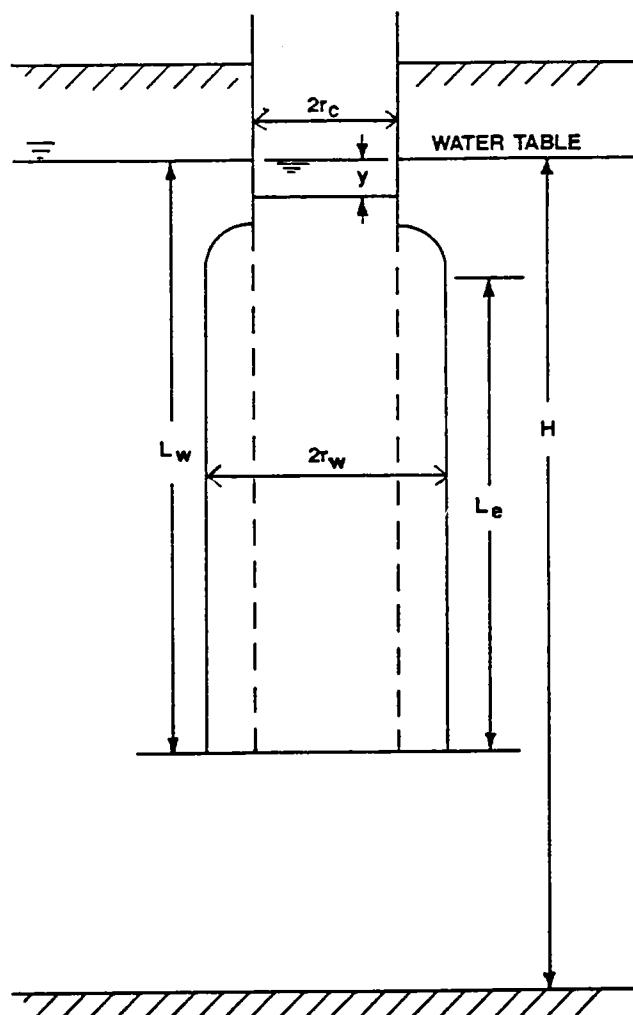
where

V = seepage velocity in ft/day,

K = hydraulic conductivity in ft/day,

i = hydraulic gradient, and

n = estimated porosity.



- r_c -radius of well.
- r_w -radius of well + total thickness of the sand/gravel pack.
- L_e -length of screened interval below the water table.
- L_w -depth of well below water table.
- H -depth to confining unit below the water table.
- y -difference between static water level outside well and water level inside well.

FIGURE D-1
DEFINITIONS OF SLUG TEST
PARAMETERS (from Bouwer, 1989)



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NW
NADEP PENSACOLA
PENSACOLA, FLORIDA

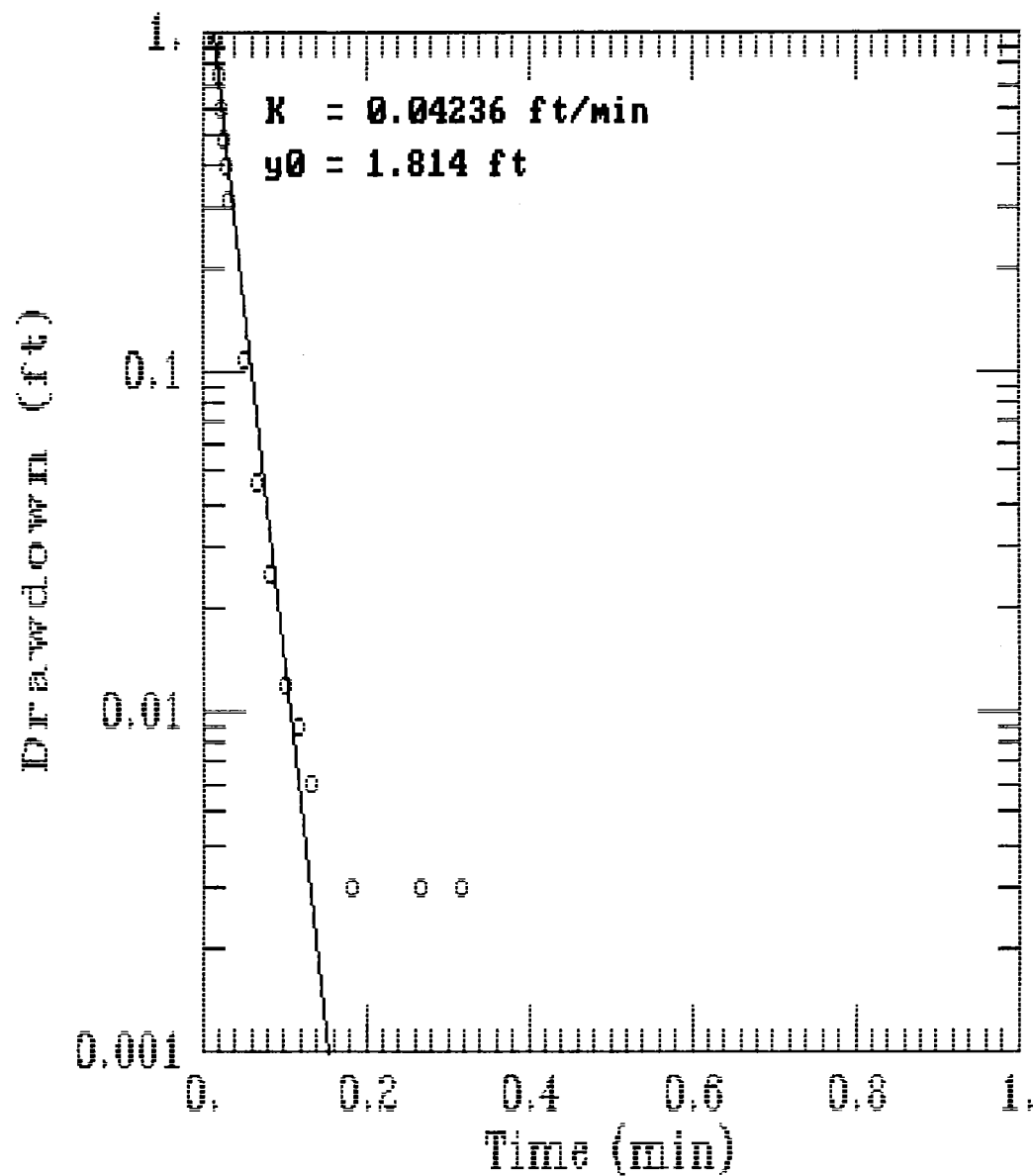
Assuming an estimated porosity of 25 percent, an average hydraulic gradient of 1.3×10^{-3} , and an average hydraulic conductivity of 5.9×10^1 ft/day, the average pore water velocity is calculated as follows:

$$v = \frac{5.9 \times 10^1 \text{ ft/day} * 1.3 \times 10^{-3} \text{ ft/ft}}{0.25}$$

$$V = 3.1 \times 10^{-1} \text{ ft/day}$$

SLUG TEST PLOTS

PEN-3221NW-MW-1 RUN #1



AQTESOLV

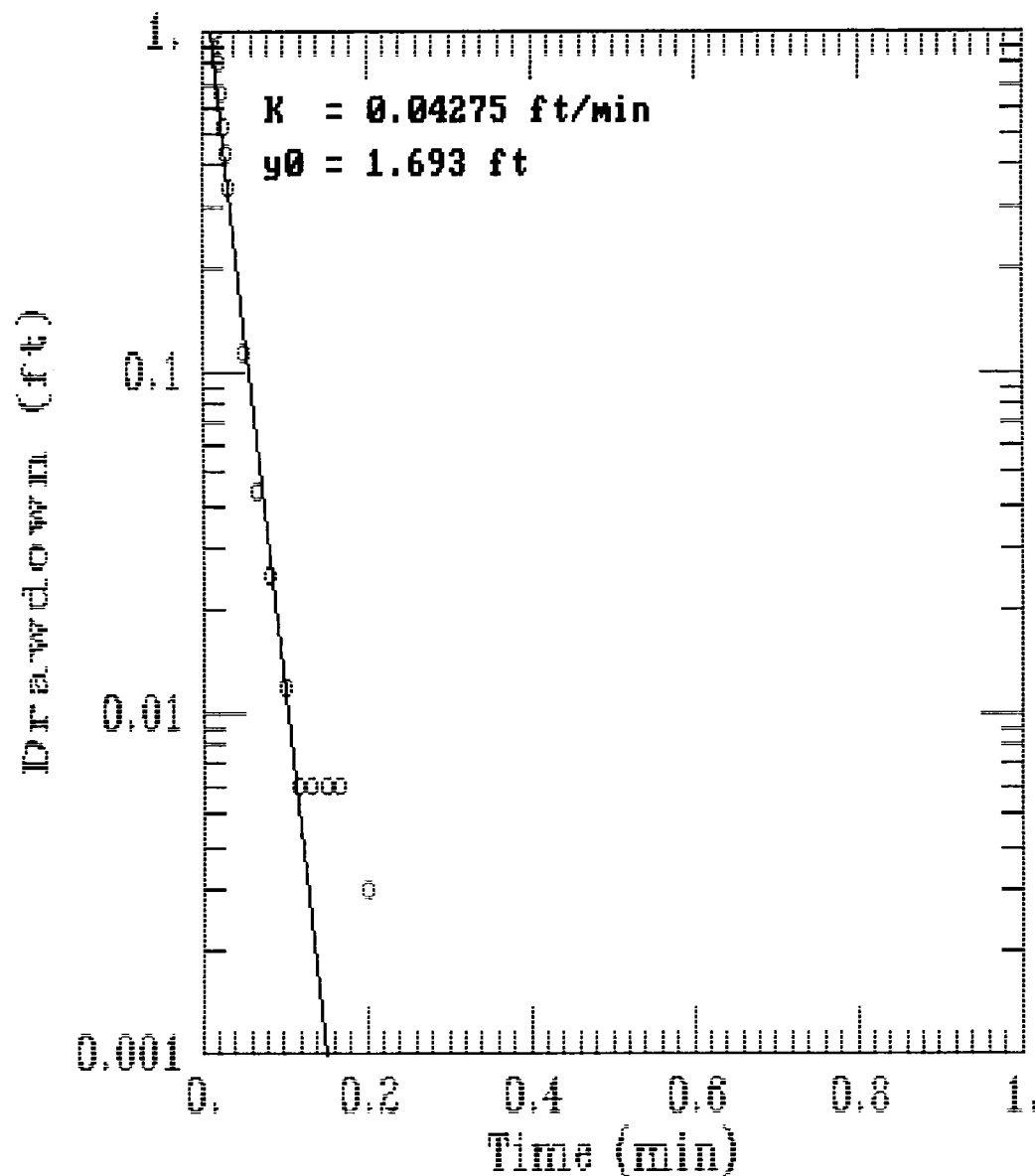


GERAGHTY
& MILLER, INC.



Modeling Group

PEN-3221NW-MW-1 RUN #2



AQTESOLV

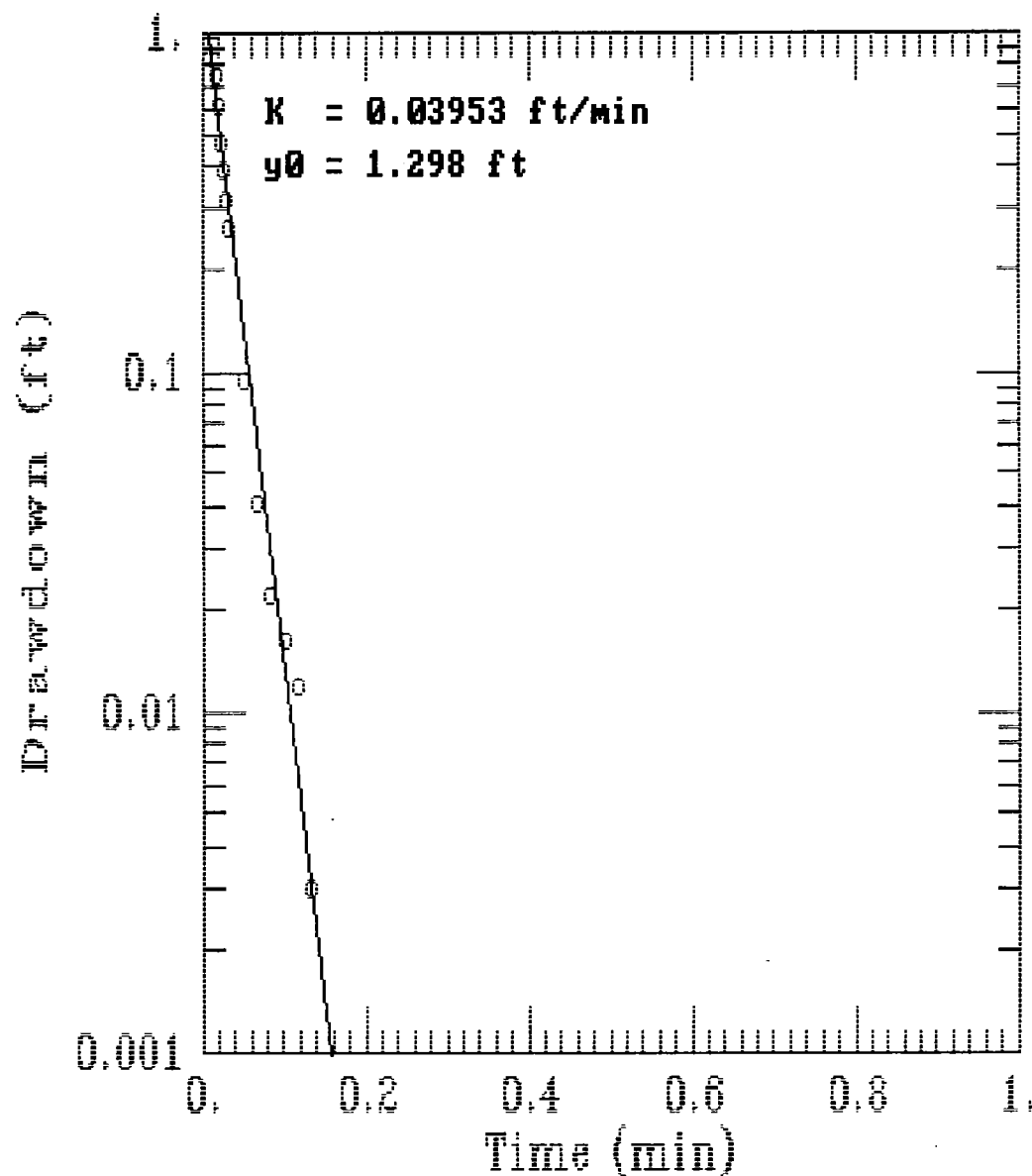


GERAGHTY
& MILLER, INC.



Modeling Group

PEN-3221NW-MW-1 RUN #3



AQTESOLV



GERAGHTY
& MILLER, INC.



Modeling Group

APPENDIX E
LABORATORY ANALYTICAL DATA

GROUNDWATER SAMPLE ANALYSES



WADSWORTH/ALERT
LABORATORIES

5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0015

NAS/NADEP PENSACOLA - PHASE I

Presented to:

ROGER DURHAM

ABB ENVIRONMENTAL SERVICES, INC.

WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

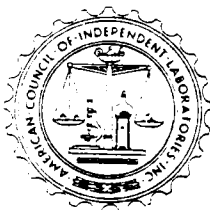
TAMPA, FL 33610

(813) 621-0784

Dan Henson
Project Manager

Randall C. Grubbs
Laboratory Director - Florida

February 20, 1992



HEADQUARTERS AND
LABORATORY
P.O. Box 2912
4101 Shuffel Drive, N.W.
North Canton, OH 44720
(216) 497-9396

REGIONAL
LABORATORY
P.O. Box 31454
5405 Schaaf Rd.
Cleveland, OH 44131
(216) 642-9151

REGIONAL
OFFICE
1445 Pisgah Church Rd.
Lexington, SC 29072
(803) 957-8590

REGIONAL
LABORATORY
5910 Breckenridge Pkwy
Suite H
Tampa, FL 33610
(813) 621-0784



WADSWORTH/ALERT
LABORATORIES, INC.

5910 Breckenridge Pkwy, Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

February 20, 1992

Mr. Roger Durham
ABB Environmental Services, Inc.
2571 Executive Center Cir. East, Suite 100
Tallahassee, FL 32301

Dear Mr. Durham,

Over the course of the past month, it was noted that toluene has begun randomly appearing in samples, trip blanks and equipment blanks at levels ranging from about 2 ug/L to about 22 ug/L. We have investigated its presence and feel that we have located the source of this random contamination problem.

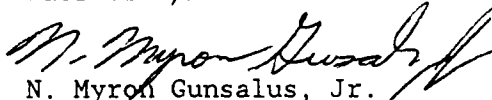
WAL began using custom printed sample container labels this past fall. At that time we evaluated the labels for any trace contaminants and found none. In late December we received a second shipment of identical labels and began using them for sampling kits sent out after 20 December 1991. The investigation of the toluene contamination led us to evaluate this second shipment of labels as well. Upon evaluation, it was found that these labels are contaminated with Toluene as well as 2-Butanone (MEK). Given that these are volatile compounds it can be demonstrated that, under certain conditions, these compounds might migrate across the septum of the sample vial.

We have discontinued use of these labels and are attempting to reissue new labels and bottles for any sample kits which are still pending. In addition we are working with the printer to determine why these labels were not made to our previously determined specifications. We have also established a policy of testing all label batches before they may be used in any kits.

The impact which these findings have on any recent or current analytical data must be determined on an individual basis. If you have any questions regarding this matter or would like to further investigate particular results, please contact your project manager or myself at (813) 621-0784. Thank you for your patience and help in this matter.

Sincerely,

Wadsworth/ALERT Laboratories


N. Myron Gunsalus, Jr.
Quality Control Coordinator



HEADQUARTERS AND
LABORATORY
P.O. Box 2912
4101 Shuffel Drive, N.W.
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(803) 957-8590

REGIONAL
LABORATORY
5910 Breckenridge Pkwy
Suite H
Tampa, FL 33610
(813) 621-0784



WADSWORTH/ALERT
LABORATORIES

INVOLVEMENT

This report summarizes the analytical results of the NADEP Pensacola/3221 NW site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Roger Durham. The samples were accepted into Wadsworth's Florida facility on 06 February 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.



WADSWORTH/ALERT
LABORATORIES

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER	METHOD

ORGANICS	
Volatile Organics	** EPA Method 601/2
Ethylene Dibromide	** EPA Method 601 Mod.
Polynuclear Aromatic Hydrocarbons	** EPA Method 625
METALS	
Lead	** EPA Method 239.2
MISCELLANEOUS	
Tot. Rec. Petroleum Hydrocarbons	** EPA Method 418.1

NOTE: ** Indicates usage of this method to obtain results for this report.

EPA Methods	-Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982 Drinking Waters USEPA, 600/4-88/039, December, 1988.
Std. Methods	-Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985.
USEPA Methods	-From 40CFR Part 136, published in Federal Register on October 26, 1984.
SW846 Methods	-Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.
ASTM Methods	-American Society for Testing and Materials.
NIOSH Method	-NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-1
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/10/92

SAMPLE ID: MW 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	2	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	1
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	98	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-1
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: MW 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-1
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/17/92

SAMPLE ID: MW 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	45	(22-135)	(10-155)
Fluorobiphenyl	41	(34-140)	(12-153)
Terphenyl-d14	27	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-1
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : MW 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/10/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-1
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: MW 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	4	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-2
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: PZ 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	3	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	97	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-2
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: PZ 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-2
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/17/92

SAMPLE ID: PZ 1 NADEP PENSACOLA/ 3221 NW

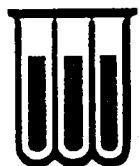
CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	52	(22-135)	(10-155)
Fluorobiphenyl	51	(34-140)	(12-153)
Terphenyl-d14	34	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-2
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : PZ 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/10/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-2
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: PZ 1 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-3
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: PZ 2 NADEP PENSACOLA/ 3221 NW

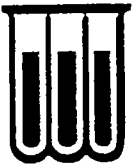
CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	3	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	110	(78-122)
Trifluorotoluene (PID)	102	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-3
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: PZ 2 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-3
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/18/92

SAMPLE ID: PZ 2 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	42	(22-135)	(10-155)
Fluorobiphenyl	44	(34-140)	(12-153)
Terphenyl-d14	30	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-3
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : PZ 2 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/10/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-3
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: PZ 2 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-4
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: PZ 3 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	2	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	103	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-4
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: PZ 3 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-4
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/18/92

SAMPLE ID: PZ 3 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	47	(22-135)	(10-155)
Fluorobiphenyl	47	(34-140)	(12-153)
Terphenyl-d14	32	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-4
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : PZ 3 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/10/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-4
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: PZ 3 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-5
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: PZ 4 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	3	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	7
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	101	(78-122)
Trifluorotoluene (PID)	102	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-5
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: PZ 4 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-5
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/18/92

SAMPLE ID: PZ 4 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5
ND* (None Detected, lower detectable limit =
-- (Not Analyzed)

ug/L) as rec'd
ug/L) as rec'd

SURROGATE RECOVERY:

%

ACCEPTABLE LIMITS

Nitrobenzene-d5
Fluorobiphenyl
Terphenyl-d14

57
56
54

WATER	SOLID
(22-135)	(10-155)
(34-140)	(12-153)
(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-5
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : PZ 4 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/10/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-5
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: PZ 4 NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-6
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: DUPLICATE NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	3	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	107	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-6
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: DUPLICATE NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-6
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/18/92

SAMPLE ID: DUPLICATE NADEP PENSACOLA/ 3221 NW

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

CERTIFICATION #: E84059
HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5
ND* (None Detected, lower detectable limit =
-- (Not Analyzed)

ug/L) as rec'd
ug/L) as rec'd

SURROGATE RECOVERY:

%

ACCEPTABLE LIMITS

Nitrobenzene-d5
Fluorobiphenyl
Terphenyl-d14

61
59
46

WATER	SOLID
(22-135)	(10-155)
(34-140)	(12-153)
(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-6
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : DUPLICATE NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/10/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-6
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: DUPLICATE NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	5	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-7
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: EQUIPMENT BLANK NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	99	(78-122)
Trifluorotoluene (PID)	100	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-7
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: EQUIPMENT BLANK NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-7
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/18/92

SAMPLE ID: EQUIPMENT BLANK NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5
ND* (None Detected, lower detectable limit =
-- (Not Analyzed)

ug/L) as rec'd
ug/L) as rec'd

SURROGATE RECOVERY:

%

ACCEPTABLE LIMITS
WATER SOLID

Nitrobenzene-d5	53	(22-135)	(10-155)
Fluorobiphenyl	59	(34-140)	(12-153)
Terphenyl-d14	86	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-7
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : EQUIPMENT BLANK NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Lead	2/10/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-7
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: EQUIPMENT BLANK NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-8
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: TRIP BLANK

NADEP PENSACOLA/ 3221 NW

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	5
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:
Bromochloromethane (HECD)
Trifluorotoluene (PID)

%
94
100

ACCEPTABLE LIMITS
(78-122)
(73-131)



WADSWORTH/ALERT
LABORATORIES

QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride
Toluene
2-Butanone
Acetone

Semi-volatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate

Metals

Calcium
Magnesium
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT
LABORATORIES QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

*****EXAMPLE*****

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	QC LIMITS	
					RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150

(compd. name)	sample	1st%	2nd%	Rel.%	accep. method
	result	recov.	recov.	diff.	perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-BK
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/10/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	99	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-BK
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/11/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	100	(78-122)
Trifluorotoluene (PID)	101	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB # 2B0602-BK
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/19/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
METHOD 601/602 - GC

Benzene	ND	1,2-Dichloroethane	ND
Bromodichloromethane	ND	1,1-Dichloroethene	ND
Bromoform	ND	1,2-Dichloroethene (Total)	ND
Bromomethane	ND	1,2-Dichloropropane	ND
Carbon tetrachloride	ND	cis-1,3-Dichloropropene	ND
Chlorobenzene	ND	trans-1,3-Dichloropropene	ND
Chloroethane	ND	Ethylbenzene	ND
2-Chloroethylvinyl ether	ND	Methylene chloride	ND
Chloroform	ND	1,1,2,2-Tetrachloroethane	ND
Chloromethane	ND	Tetrachloroethene	ND
Dibromochloromethane	ND	Toluene	ND
1,2-Dichlorobenzene	ND	1,1,1-Trichloroethane	ND
1,3-Dichlorobenzene	ND	1,1,2-Trichloroethane	ND
1,4-Dichlorobenzene	ND	Trichloroethene	ND
Dichlorodifluoromethane	ND	Trichlorofluoromethane	ND
1,1-Dichloroethane	ND	Vinyl chloride	ND
		Xylenes	ND
		Methyl-tert-butylether	ND

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = ug/L) as rec'd
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS
Bromochloromethane (HECD)	105	(78-122)
Trifluorotoluene (PID)	103	(73-131)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-BK
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: NA
DATE ANALYZED: 2/13/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

SELECTED ORGANIC COMPOUNDS ANALYTICAL REPORT

PARAMETER	RESULT (ug/L)	DETECTION LIMIT
Ethylene dibromide	ND	0.02

NOTE: ND (None Detected) as rec'd
J (Detected, but below quantitation limit; estimated value)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-BK
MATRIX: WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/11/92
DATE ANALYZED: 2/17/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059

POLYNUCLEAR AROMATIC HYDROCARBONS
METHOD 625 HSL/TCL LIST - GC/MS

HRS84297

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(ghi)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenz(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
1-Methylnaphthalene	ND
2-Methylnaphthalene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 5
ND* (None Detected, lower detectable limit =
-- (Not Analyzed)

ug/L) as rec'd
ug/L) as rec'd

SURROGATE RECOVERY:

%

ACCEPTABLE LIMITS

WATER SOLID

Nitrobenzene-d5
Fluorobiphenyl
Terphenyl-d14

60
60
79

(22-135) (10-155)
(34-140) (12-153)
(10-132) (13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B0602-BK
MATRIX : WATER

DATE RECEIVED: 2/ 6/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Lead	2/10/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B0602-BK
MATRIX : WATER

DATE RECEIVED: 2/ 6/92
DATE EXTRACTED: 2/14/92
DATE ANALYZED: 2/14/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B0602-LCS
MATRIX: WATER
METHOD: 601/2

DATE RECEIVED: 02/06/92
DATE EXTRACTED: NA
DATE ANALYZED: 02/10/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	100	43-131
Trichloroethene	93	75-123
Chlorobenzene	102	58-133
Toluene	100	70-117
Benzene	95	70-117
Dichlorobromomethane	102	61-133



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B0602-LCS
MATRIX: WATER
METHOD: 601/2

DATE RECEIVED: 02/06/92
DATE EXTRACTED: NA
DATE ANALYZED: 02/11/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	77	43-131
Trichloroethene	102	75-123
Chlorobenzene	98	58-133
Toluene	96	70-117
Benzene	89	70-117
Dichlorobromomethane	116	61-133



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B0602-LCS
MATRIX: WATER
METHOD: 601/2

DATE RECEIVED: 02/06/92
DATE EXTRACTED: NA
DATE ANALYZED: 02/19/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
1,1-Dichloroethene	60	43-131
Trichloroethene	83	75-123
Chlorobenzene	101	58-133
Toluene	103	70-117
Benzene	100	70-117
Dichlorobromomethane	82	61-133



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B0602-LCS
MATRIX: WATER
METHOD: 601 Mod.

DATE RECEIVED: 02/06/92
DATE EXTRACTED: NA
DATE ANALYZED: 02/13/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS %RECOVERY
Ethylene Dibromide	81	81-135



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B0602-LCS
MATRIX: WATER
METHOD: 625

DATE RECEIVED: 02/06/92
DATE EXTRACTED: 02/11/92
DATE ANALYZED: 02/17/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Acenaphthene	103	31-105
Pyrene	93	12-108



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B0602-LCS
MATRIX: WATER

DATE RECEIVED: 02/06/92
DATE PREP'D: 02/10/92
DATE ANALYZED: 02/10/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Lead, furnace	91	64-131



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B0602-LCS
MATRIX: WATER

DATE RECEIVED: 02/06/92
DATE EXTRACTED: 02/14/92
DATE ANALYZED: 02/14/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Tot. Rec. Pet. Hydrocarbons	101	75-124



WADSWORTH/ALERT
LABORATORIES

LAB#: 2B0602-4
MATRIX: WATER
METHOD: 601/2

DATE RECEIVED : 02/06/92
DATE EXTRACTED: NA
DATE ANALYZED : 02/19/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS	
				RPD	RECOVERY
1,1-Dichloroethene	78	70	11	28	43-131
Trichloroethene	98	89	10	13	75-123
Chlorobenzene	115	107	7	24	58-133
Toluene	116	108	7	16	70-117
Benzene	112	107	5	15	70-117
Dichlorobromomethane	98	89	10	22	61-133



WADSWORTH/ALERT
LABORATORIES

LAB#: 2B0602-2
MATRIX: WATER

DATE RECEIVED: 02/06/92
DATE PREP'D: 02/10/92
DATE ANALYZED: 02/10/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
INORGANIC PARAMETERS - METALS

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS	
				RPD	RECOVERY
Lead, furnace	89	87	2	24	76-124

5910-H BRECKENRIDGE PARKWAY/TAMPA, FL 33610
(813) 621-0784

No 4812

[illegible]

WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM

Client: ARB Project Name/Number: NADEP PENSACOLA 3221 NW

Samples Received By: Robert Thompson Date Received: 2/6/92
(Signature)

Sample Evaluation Form By: Robert Thompson LAB No: 3811/2B0602-168
(Signature)

Type of shipping container samples received in? WAL Cooler ☒

Client Cooler ☐ WAL Shipper ☐ Box ☐ Other ☐

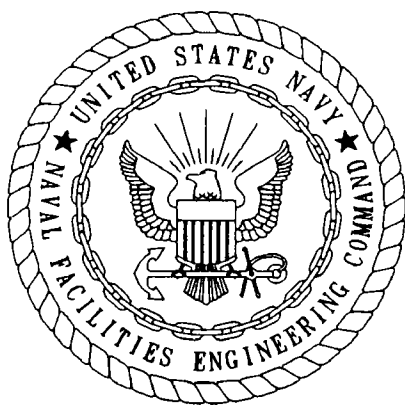
Any "NO" responses or discrepancies should be explained in comments section.

- | | YES | NO |
|---|-------------------------------------|--------------------------|
| 1. Were custody seals on shipping container(s) intact? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Were custody papers properly included with samples? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4. Did all bottles arrive in good condition (unbroken)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 5. Were all bottle labels complete (Sample No., date, signed, analysis preservatives)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 6. Were correct bottles used for the tests indicated? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 7. Were proper sample preservation techniques indicated? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 8. Were samples received within adequate holding time? | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 9. Were all VOA bottles checked for the presence of air bubbles?
(If air bubbles were found indicate in comment section) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 10. Were samples in direct contact with wet ice?
(NOTE TEMPERATURE BELOW) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 11. Were samples accepted into the laboratory?
(If no see comments) | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler # N/A Temp 1 °C Cooler # Temp °C

Cooler # Temp °C Cooler # Temp °C

Comments: REC. TRIP BLANK (NOT LISTED ON C.O.C.)

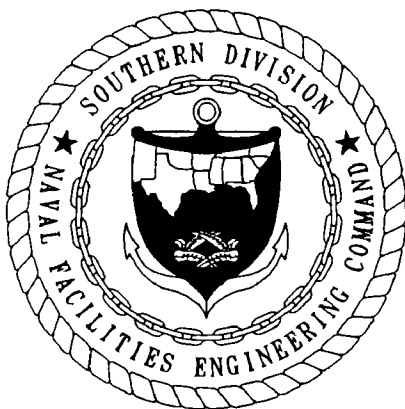


DRAFT

**CONTAMINATION ASSESSMENT
REPORT**

**SITE 607NE
NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

JUNE 1992



**SOUTHERN DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
CHARLESTON, SOUTH CAROLINA
29411-0068**

**DRAFT
NOT FOR PUBLIC RELEASE**

CONTAMINATION ASSESSMENT REPORT

**SITE 607NE
NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

UIC: N00204

Contract No. N62467-89-D-0317

Prepared by:

**ABB Environmental Services, Inc.
2590 Executive Center Circle, East
Tallahassee, Florida 32301**

Authors:

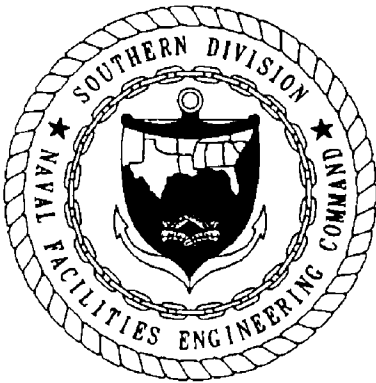
Roger Durham

Prepared for:

**Department of the Navy, Southern Division
Naval Facilities Engineering Command
2155 Eagle Drive
Charleston, South Carolina 29411-0068**

Luis Vazquez, Code 1843, Engineer-in-Charge

June 1992



FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Environmental Coordinator, NADEP Pensacola, Pensacola, Florida, or to Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 1843, at AUTOVON 5630613 or 803-743-0613.

EXECUTIVE SUMMARY

During an underground storage tank (UST) removal program conducted by the Navy in 1989 and 1990, 18 sites at the Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, were identified as having soil contamination exceeding State regulatory standards for total recoverable petroleum hydrocarbons (TRPH). ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a Contamination Assessment (CA) for each of the 18 sites.

Site 607NE is the former location of a 500-gallon waste oil UST. The tank was located near the northeast corner of Building 607, which is located on the southern perimeter of Chevalier Field. During the tank removal program, the UST was removed and replaced with a new waste oil UST located approximately 15 feet west of the abandoned tank.

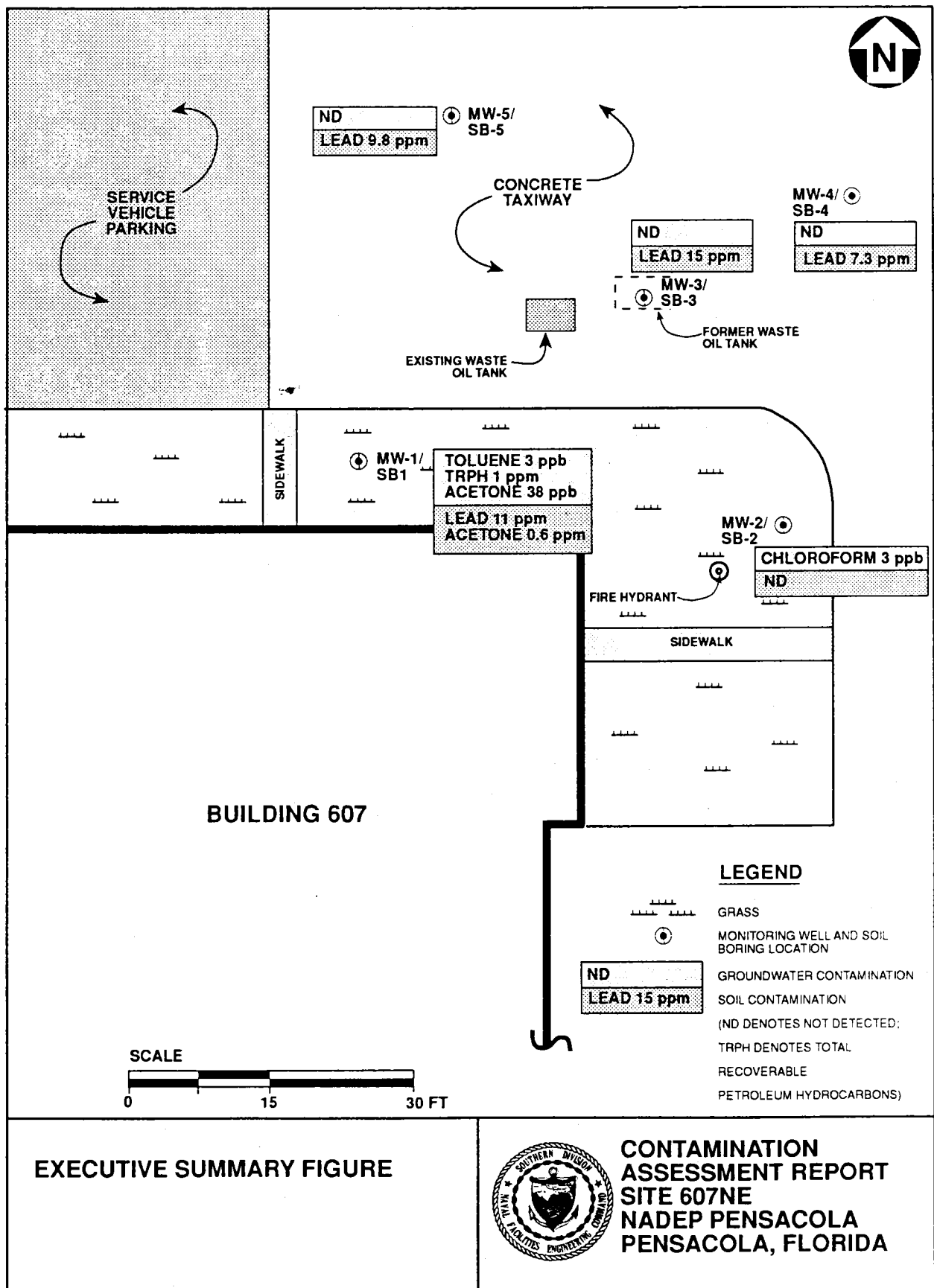
Soil borings and monitoring wells were placed at the site during the CA to assess the degree of soil and groundwater contamination. Soil and groundwater samples were collected and analyzed for appropriate parameters. Locations of soil borings and monitoring wells and laboratory analytical results are summarized in the Executive Summary Figure. The findings, conclusions, and recommendations of the CAR are summarized below.

Findings

- No petroleum hydrocarbons were identified in site soils by Organic Vapor Analyzer (OVA) headspace analysis.
- Methylene chloride and di-n-butyl phthalate were found in the sample from soil boring SB3 but were also detected in the laboratory blank; hence, their presence appears to be the result of laboratory contamination. Lead and arsenic were the only metals contaminants identified in site soils, and their concentrations did not exceed State regulatory levels.
- Contaminants identified in the groundwater were chloroform, methylene chloride, toluene, and acetone. Methylene chloride was the only contaminant that exceeded State regulatory standards. The presence of methylene chloride in the equipment blank, trip blank, and laboratory blank indicates that its presence in the groundwater samples is a result of laboratory contamination. Seventeen tentatively identified compounds were detected in the sample collected from MW1. These compounds are generally used as perfume or cleaning agents, and their presence does not appear to be the result of a petroleum discharge.

Conclusions

- The net groundwater flow direction at the site is toward the east.
- The level of soil and groundwater contamination found at the site is minimal, is below regulatory standards, and is not expected to impact potable water supplies on the base.



Recommendations

Because no petroleum contaminants were identified at the site, and because other contaminants identified did not exceed regulatory or guidance levels, A *No Further Action Proposal (NFAP)* is recommended.

ACKNOWLEDGMENTS

In preparing this report, The Underground Storage Tank Section of the Navy Comprehensive Long-Term Environmental Action, Navy (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel of the Naval Aviation Depot (NADEP) Pensacola, Florida, and Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). In particular, ABB-ES acknowledges the effort provided by the following people during the investigation and preparation of this report.

Name	Title	Position	Location
Luis Vazquez	Environmental Engineer	Engineer-in-Charge	SOUTHNAVFACENGCOM
Danny Freeman	Environmental Coordinator	Environmental Coordinator	NADEP Pensacola

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Pensacola, Florida

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Site 607NE, Naval Aviation Depot
Pensacola, Florida

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GLOSSARY

The following list contains many of the acronyms, initialisms, abbreviations, and units of measure used in this report.

ABB-ES	ABB Environmental Services, Inc.
BDL	below detection limits
BETX	benzene, ethyl benzene, toluene, and xylenes
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
ft/day	feet per day
GC	gas chromatograph
HSWA	Hazardous and Solid Waste Amendments of 1984
K	hydraulic conductivity
msl	mean sea level
NADEP	Naval Aviation Depot
NARF	Naval Air Rework Facility
NAS	Naval Air Station
NGVD	National Geodetic Vertical Datum
OVA	Organic Vapor Analyzer
PAH	polynuclear aromatic hydrocarbons
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RAP	Remedial Action Plan
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFACENGCOM	Southern Division Naval Facilities Engineering Command
SPT	standard penetration test
SWDA	Solid Waste Disposal Act of 1965
T	transmissivity
TRPH	total recoverable petroleum hydrocarbons
µg/l	micrograms per liter
UIC	uniform identification code
µmhos/cm	micromhos per centimeter
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
UST	underground storage tank
V	average pore water velocity
VOA	volatile organic aromatics

1.0 INTRODUCTION

In 1987, the Naval Air Rework Facility (NARF) in Pensacola, Florida, was renamed the Naval Aviation Depot (NADEP). NADEP Pensacola, Florida, formerly the operations and repair department of the Naval Air Station (NAS) Pensacola, is now a tenant command located on NAS facilities within the Pensacola Naval Base Complex. The Pensacola Naval Base Complex is located on the western edge of Pensacola Bay on State Route 295 (Navy Road; Figure 1-1). NADEP Pensacola occupies approximately 130 acres at NAS Pensacola. The mission of NADEP Pensacola is to maintain and operate facilities for, and perform a complete range of, depot-level rework operations on designated weapons systems, accessories, and equipment; manufacturing parts and assemblies, as required; providing engineering services in hardware design; furnishing technical services on aircraft maintenance and logistic problems; and performing other levels of aircraft maintenance.

During a tank removal program implemented by the Navy in 1989 and 1990, petroleum underground storage tanks (USTs) at various NADEP site locations were removed. In many cases, these tanks were replaced with new USTs. Tank contents were reportedly restricted to petroleum products ranging from waste oil, diesel fuel, unleaded gasoline, and PD-680 (a petroleum distillate solvent similar to mineral spirits). The reported volumes of the tanks varied from 500 to 3,000 gallons. Soil samples were collected from each tank excavation and analyzed for total recoverable petroleum hydrocarbons (TRPH). Based on TRPH concentrations, 18 sites were found to be non-compliant with Florida Department of Environmental Regulation (FDER) standards, as defined in Chapter 17-770, Florida Administrative Code (FAC).

ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for the 18 petroleum contaminated sites at NADEP. This CAR is submitted for one of the sites, Site 607NE. The scope of services for the work at Site 607NE is described in Contract Task Order (CTO) No. 008, the Plan of Action (POA), and the Contamination Assessment Plan (CAP) and included the following:

- drilling of five soil borings and analysis of site soils to assess the extent of soil contamination,
- installing and sampling five groundwater monitoring wells to assess the extent of groundwater contamination,
- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site.
- conducting a potable well inventory within a 1/4-mile radius of the site,
- conducting slug tests on select wells to estimate aquifer characteristics, and
- reducing and analyzing pertinent data gathered during the CA to complete this CAR.

The CA at Site 607NE was conducted from January through April 1992. The following sections of the report present the background information, data compilation, results, conclusions, and recommendations of the CAR.

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. Site 607NE is located near the northeast corner of Building 607, which is on the north side of Saufley Street on the south perimeter of Chevalier Field (Figure 2-1). The site is the former location of an UST reportedly used for waste oil and used aviation fuel storage. Chevalier Field is the location of various activities primarily involving servicing and testing of helicopters. Building 607 is used as a helicopter flight test facility and primary activities include final preparation before helicopter test flights.

2.2 SITE HISTORY. The UST was installed in 1980. During the Navy tank removal and installation program, the old UST was removed and replaced with a double-walled, steel, 500-gallon UST located approximately 15 feet west of the former UST. The existing tank is also reportedly used for the storage of waste oil and aviation fuel. Figure 2-2 is a site plan showing the locations of the existing and former USTs and surface features in the site vicinity. Most of the area around the site is covered by 6 to 8 inches of concrete. Some grassy areas are present along the perimeter of Building 607.

During the tank removal program, a composite soil sample was collected from the former UST excavation and analyzed for TRPH. The reported TRPH concentration of 190 parts per million (ppm) exceeded the FDER regulatory standard of 50 ppm for petroleum contaminated soils (FDER, February, 1991) and, therefore, warranted further site investigation pursuant to Chapter 17-770, FAC. The contaminated soil was removed from the site and disposed by the Navy.

An additional tank of unknown contents is reportedly located at the site, but its location was not identified in this investigation nor in the tank removal program.

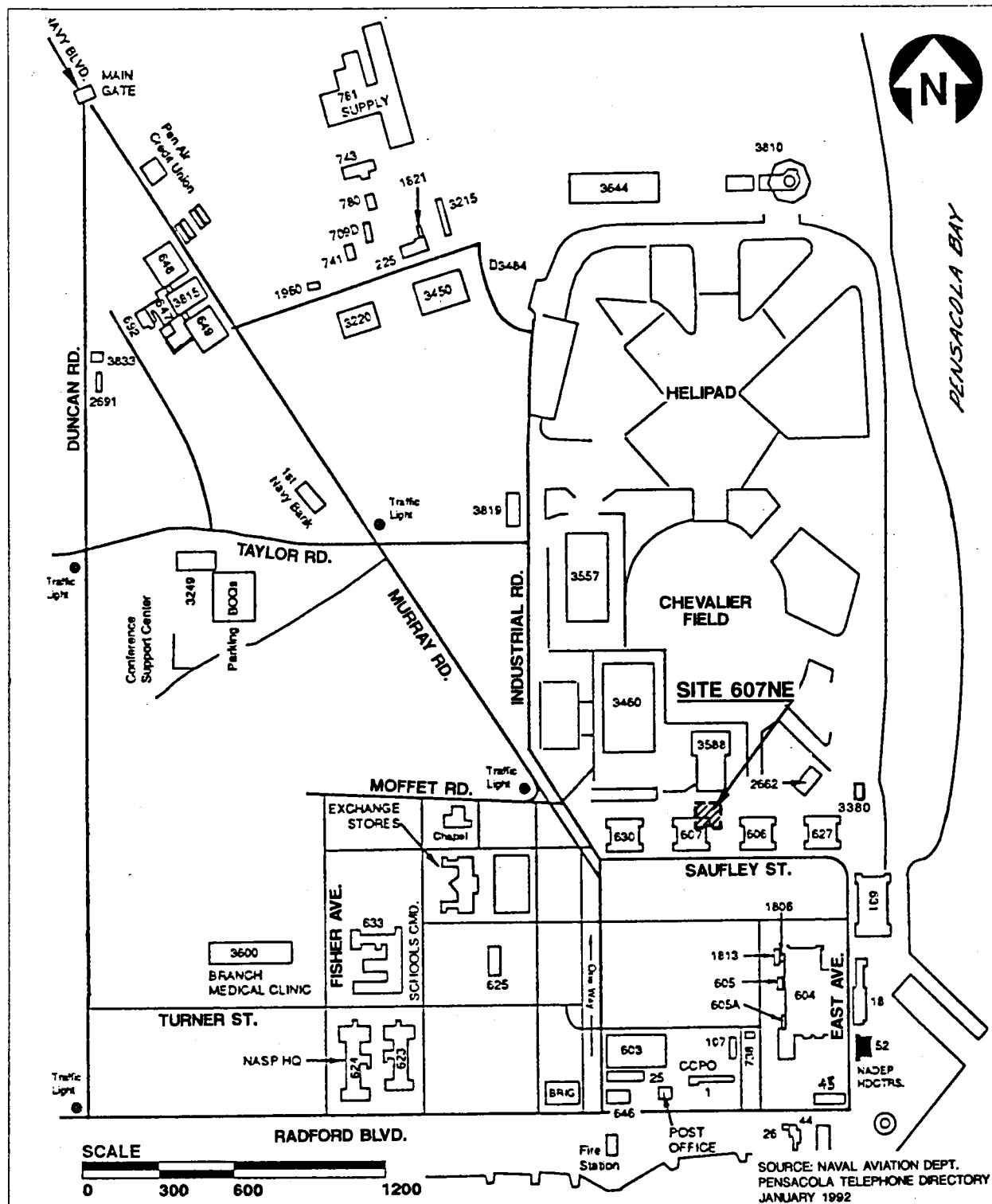
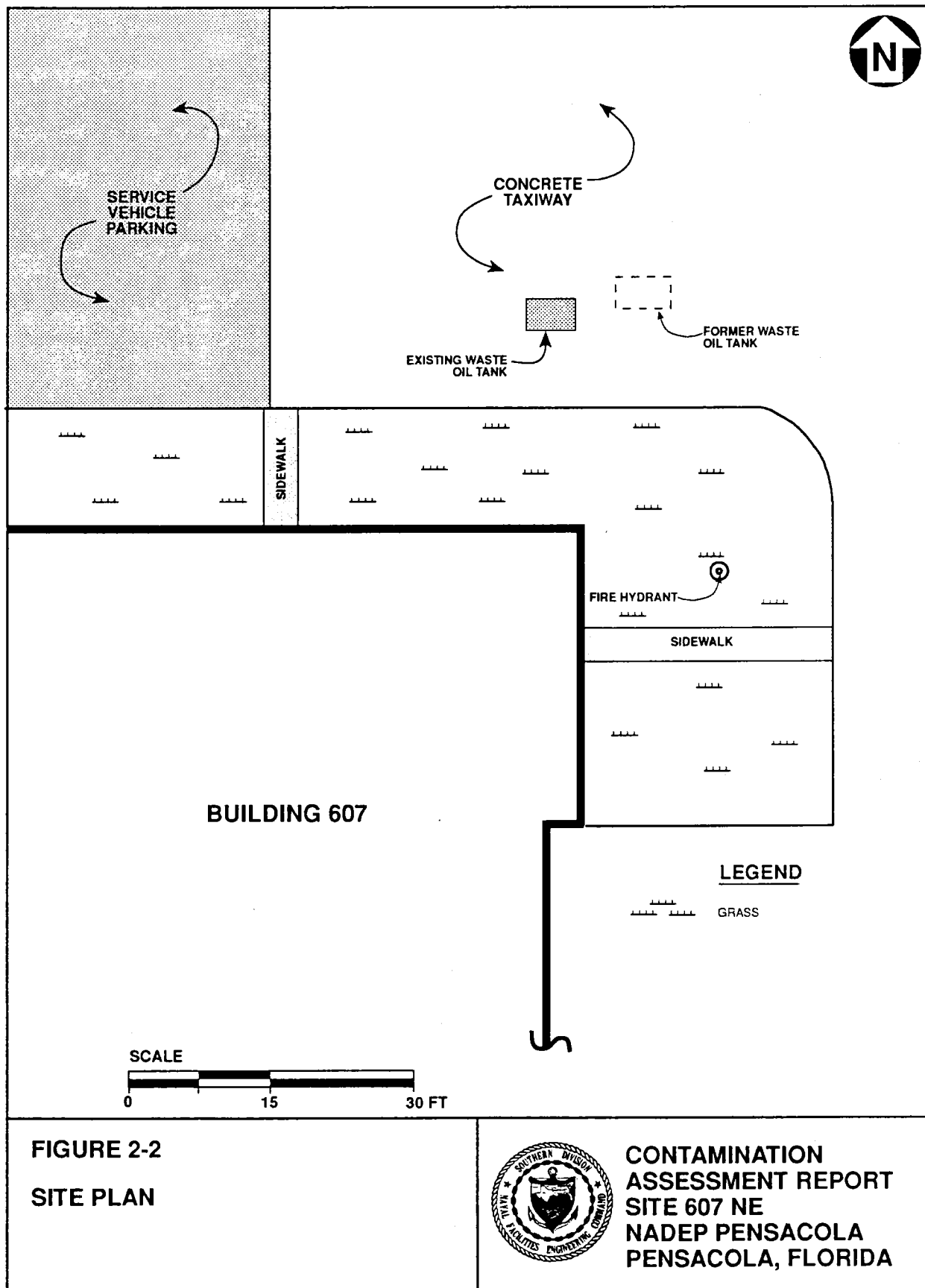


FIGURE 2-1
SITE LOCATION MAP



CONTAMINATION
ASSESSMENT REPORT
SITE 607NE
NADEP PENSACOLA
PENSACOLA, FLORIDA



3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix A. Surface elevations at the site are relatively flat and vary from 8 to 9 feet above mean sea level.

3.2 HYDROGEOLOGY.

3.2.1 Regional and Local The Pensacola area is underlain by three water bearing zones. These zones, in order of increasing depth, are the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer. A detailed discussion of these three aquifers is presented in Appendix A.

3.2.2 Site-Specific The principal aquifer of concern at the site is the surficial zone of the sand-and-gravel aquifer. The surficial zone is composed of white to grey to light brown, fine to medium-grained quartz sands. The surficial zone is unconfined, and the water table was encountered at depths of 4 to 6 feet below land surface (bls) during this investigation. Site-specific aquifer characteristics and other hydrogeologic parameters are discussed in Section 5.1.

Complete lithologic logs for all site monitoring wells are presented in Appendix B.

4.0 METHODOLOGIES AND EQUIPMENT

4.1 SOIL BORING AND SOIL SAMPLING PROGRAM. Five soil borings were drilled at the site on January 23 and 24, 1992, to assess the extent and levels of soil petroleum contamination, to identify the type of subsurface material, and to aid in the placement of subsequent groundwater monitoring wells. Soil boring locations are shown in Figure 4-1. Composite soil samples collected from split-spoon standard penetration tests (SPTs) were analyzed for petroleum constituents with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). Samples were sent to Wadsworth/Alert Laboratories in Tampa, Florida, for metals analyses. The results of the soil boring program and soil sampling program are discussed in Section 5.2.

4.2 MONITORING WELL INSTALLATION PROGRAM. Five, 2-inch inner diameter (ID) monitoring wells (PEN-607NE-MW1 through PEN 607NE-MW5 and designated as MW1 through MW5 on figures and tables in this report) were installed in each soil boring. Monitoring well locations are shown in Figure 4-1. Monitoring well construction methodologies and materials are discussed in Appendix C.

4.3 GROUNDWATER ELEVATION SURVEY. The elevation and slope of the water table were determined by surveying the top of the well casing for each monitoring well to a common reference datum using a surveyor's level and stadia rod. Elevations were referenced to the benchmark located on the northeast face of Building 631, which is located several hundred feet easterly of the site. This benchmark is part of the U.S. Coastal and Geodetic Survey benchmarking system and has an elevation of 11.15 feet above the National Geodetic Vertical Datum (NGVD) of 1929.

Groundwater level measurements were collected on February 6 and March 31, 1992. Procedures for ground water level measurements are contained in Appendix C.

4.4 GROUNDWATER SAMPLING PROGRAM. Groundwater samples were collected from each monitoring well on February 6, 1992. The samples were sent to Wadsworth/Alert Laboratories in Tampa, Florida, for analysis. A duplicate sample, laboratory blanks, equipment blank, and a trip blank were also analyzed with the monitoring well samples. Procedures for collection of groundwater samples are presented in Appendix C.

4.5 AQUIFER SLUG TESTS. Three rising head slug tests were performed on monitoring well PEN-607NE-MW5 to assess the hydraulic conductivity of the aquifer. Procedures for conducting slug tests are included in Appendix C. Slug test data graphs and calculations are attached in Appendix D.

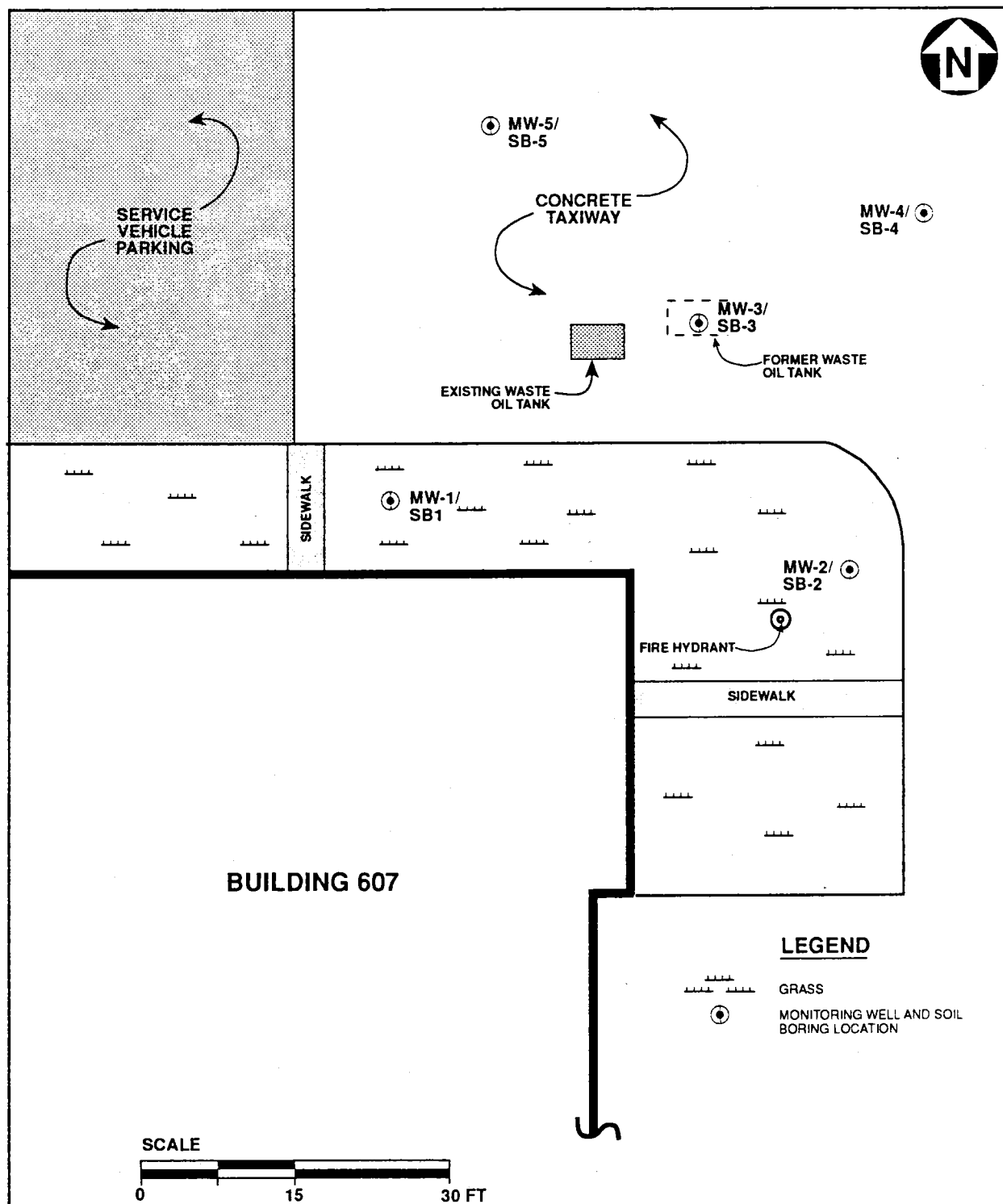


FIGURE 4-1

**MONITORING WELL AND
SOIL BORING LOCATIONS**



**CONTAMINATION
ASSESSMENT REPORT
SITE 607 NE
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PENSACOLA, FLORIDA**

5.0 CONTAMINATION ASSESSMENT RESULTS

5.1 SITE-SPECIFIC AQUIFER CHARACTERISTICS AND HYDROGEOLOGIC PARAMETERS. The surficial zone of the sand-and-gravel aquifer is the primary interval of concern at the site. The surficial zone is unconfined, and the water table was encountered at depths from 4 to 6 feet bls.

Groundwater level measurements in all site monitoring wells were collected on February 6 and March 31, 1992. These measurements are shown in Table 5-1 and were used to construct water table elevation contour maps to delineate the direction of groundwater flow at the site. Water table elevation contour maps for each date are shown in Figures 5-1 and 5-2. Both indicate an easterly groundwater flow direction in the surficial zone.

Table 5-1
Top of Casing and Groundwater Elevations
February 6 and March 31, 1992

Contamination Assessment Report
Site 607NE, Naval Aviation Depot
Pensacola, Florida

Well Number	February 6, 1992			March 31, 1992		
	TOC	DTW	Groundwater Elevation	TOC	DTW	Groundwater Elevation
MW-1	9.12	5.32	3.80	9.12	5.75	3.37
MW-2	8.91	5.22	3.69	8.91	5.63	3.28
MW-3	8.30	4.58	3.72	8.30	4.97	3.33
MW-4	8.38	4.67	3.71	8.38	5.07	3.31
MW-5	8.29	4.52	3.77	8.29	4.90	3.39

Notes: TOC = top of casing.
DTW = depth to water.

The average hydraulic gradient across the site is 2.1×10^{-3} feet per foot (ft/ft). Slug tests performed for monitoring well PEN-607NE-MW5 indicate an average horizontal hydraulic conductivity (K) of 7.2 feet per day (ft/day). The calculated pore water velocity (V) is 6.0×10^{-2} ft/day, and the calculated transmissivity (T) is 5.8×10^1 square feet per day (ft²/day). Equations and calculations used to determine these values are presented in Appendix D.

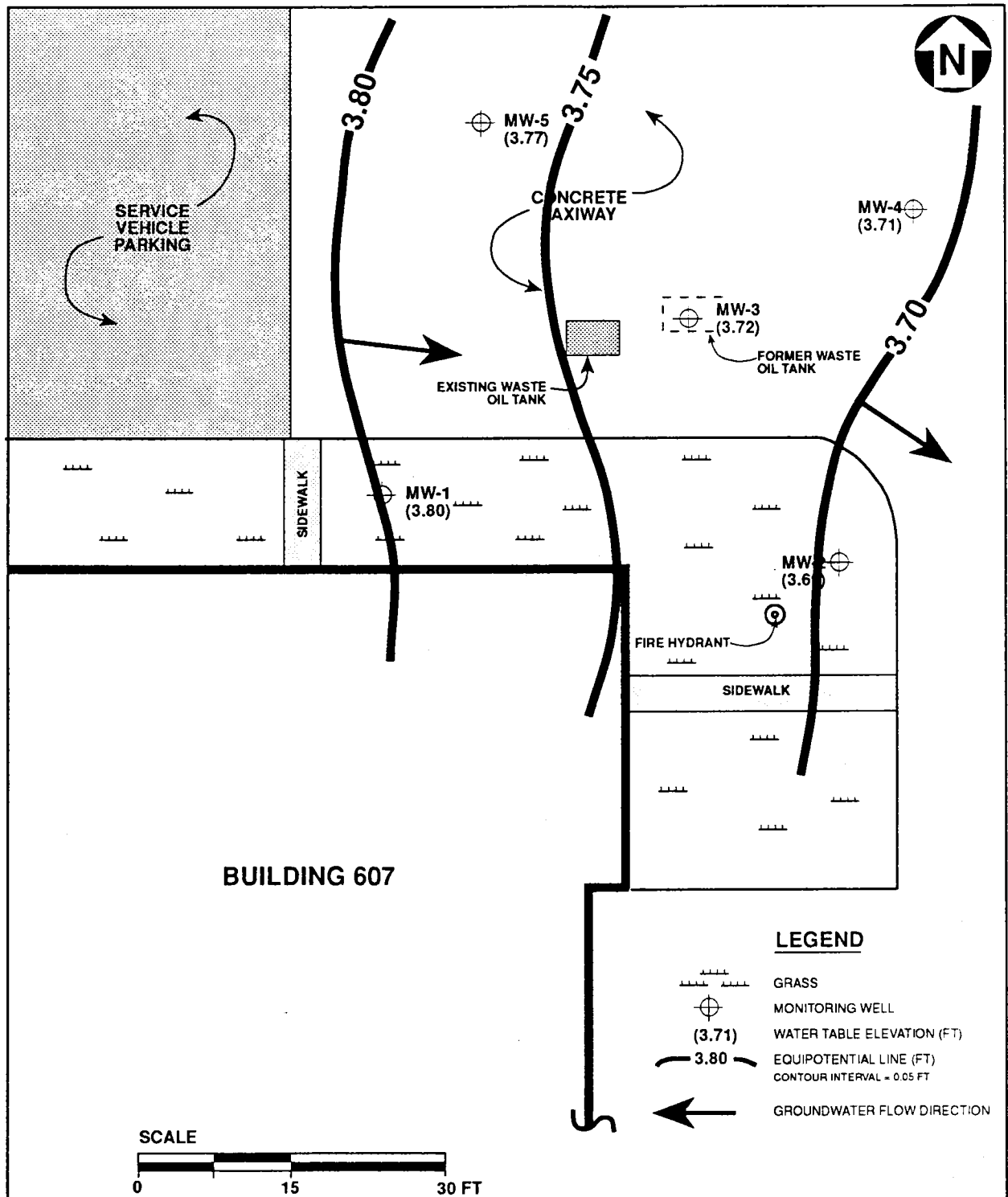


FIGURE 5-1

**WATER TABLE ELEVATION
CONTOUR MAP
SURFICIAL ZONE
SAND-AND-GRAVEL AQUIFER
FEBRUARY 6, 1992**



**CONTAMINATION
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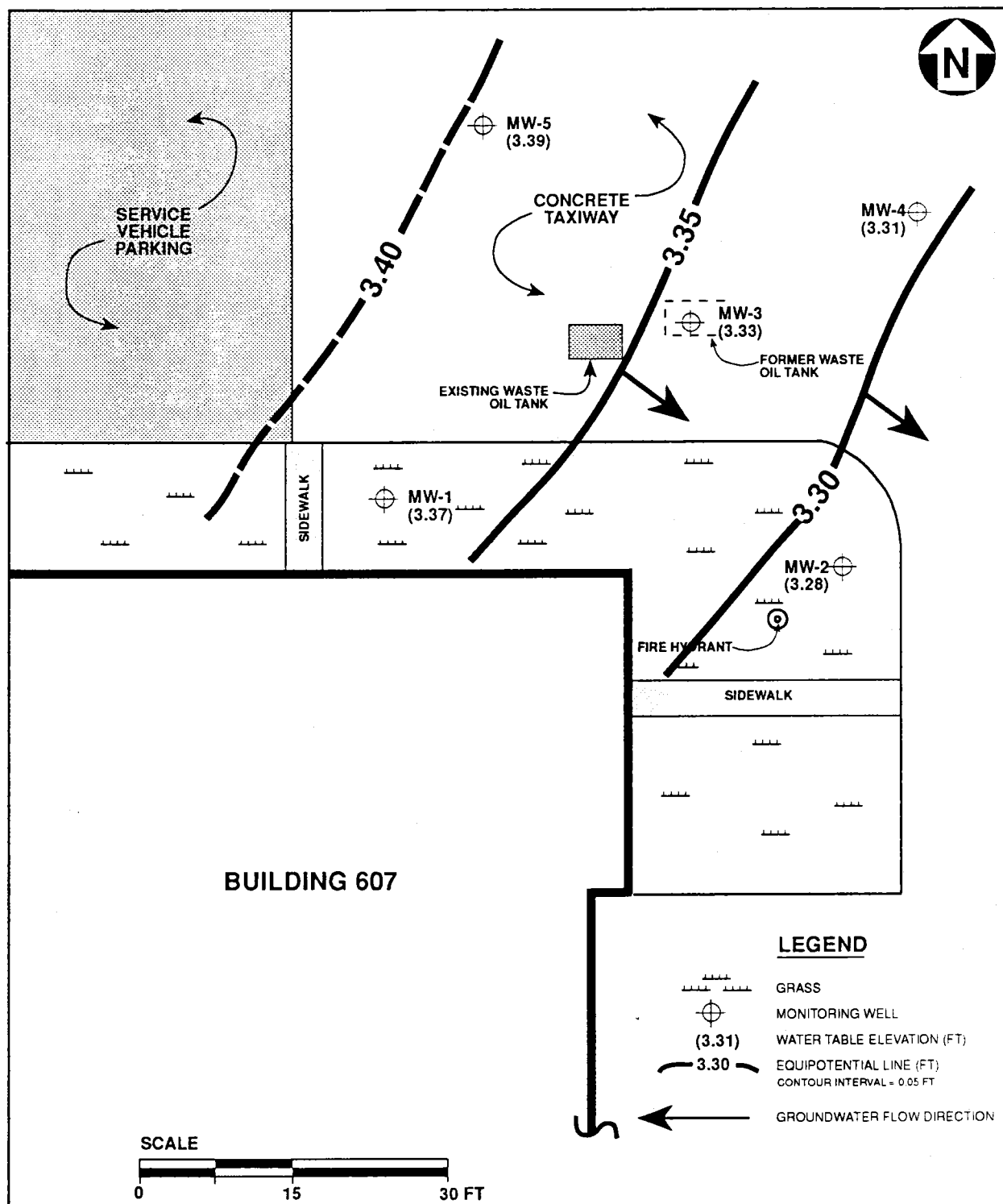


FIGURE 5-2

**WATER TABLE ELEVATION
CONTOUR MAP
SURFICIAL ZONE
SAND-AND-GRAVEL AQUIFER
MARCH 31, 1992**



**CONTAMINATION
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5.2 CONTAMINANT PLUME DEFINITION AND CHARACTERIZATION.

5.2.1 Soil Contamination Composite soil samples were collected from all SPT samples at depths of 4 to 6 feet bls and from SB3 at a depth of 2 to 4 feet bls and analyzed by OVA headspace techniques. The samples were then submitted to Wadsworth/Alert Laboratories (Wadsworth) in Tampa, Florida, for total metals analysis. The soil sample collected at the former waste oil UST location, sample SB3 (4 to 6 feet bls), was also analyzed for TRPH, and by U.S. Environmental Protection Agency (USEPA) Methods 8240 and 8270, and the Toxicity Characteristic Leaching Procedure (TCLP) for metals. Summaries of the OVA and soil analyses results are presented in Tables 5-2 and 5-3, respectively.

**Table 5-2
Summary of Soil Sample OVA Headspace Analyses
January 23 and 24, 1992**

Contamination Assessment Report
Site 607NE, Naval Aviation Depot
Pensacola, Florida

Boring Designation	Depth (feet)	Concentration ¹ (ppm)	Comments
SB1/MW1	4 to 6	0	No odor and no discoloration
SB2/MW2	4 to 6	0	No odor and no discoloration
SB3/MW3	4 to 6	0	No odor and no discoloration
SB4/MW4	4 to 6	0	No odor and no discoloration
SB5/MW5	4 to 6	0	No odor and no discoloration

¹Corrected for methane.

Note: ppm = parts per million.

Table 5-3
Summary of Soil Sample Analyses
January 23 and 24, 1992 Sampling Event

Contamination Assessment Report
Site 607NE, Naval Aviation Depot
Pensacola, Florida

Sample ID	Total Metals Analysis Concentration (ppm)				
	Depth (feet)	Arsenic	Cadmium	Chromium	Lead
SB1	4 to 6	0.6	ND	ND	11
SB2	4 to 6	ND	ND	ND	ND
SB3	2	ND	ND	ND	15
SB3	4 to 6	ND	ND	ND	11
SB4	4 to 6	ND	ND	ND	5.1
SB4 duplicate	4 to 6	ND	ND	ND	7.3
SB5	4 to 6	ND	ND	ND	9.8
State regulatory level		55	55	275	77

Sample ID	Toxicity Characteristic Leaching Procedure Metals Analysis (ppm)				
	Depth (feet)	Arsenic	Cadmium	Chromium	Lead
SB3	4 to 6	ND	ND	ND	0.22
TCLP regulatory level		5.0	1.0	5.0	5.0

Duplicate sample collected from SB4.

Notes: ppm = parts per million.
ND = not detected.

No volatile organic compounds (VOCs) were detected in the OVA readings, and no discoloration or petroleum odors were observed in site soils. Methylene chloride and di-n-butyl phthalate were identified in sample SB3 (at 4 to 6 feet bls). These compounds were also present in the laboratory blank, which suggests that their presence in the sample from SB3, at 4 to 6 feet bls, is the result of laboratory contamination. No other petroleum hydrocarbon compounds were identified in soil samples at the site.

Total metals analyses indicated the presence of arsenic and lead in site soils (Table 5-3; Figure 5-3). Arsenic was detected in only the sample from SB1 at a concentration of 0.6 ppm, which is below the FDER guidance concentration for total arsenic in soils of 55 ppm (FDER, February, 1991). The highest concentration of lead detected during total metals analysis was 15 parts per million (ppm), which is below the FDER regulatory concentration of 77 ppm (FDER, February, 1991). The TCLP lead value for the sample from SB3 at 4 to 6 feet bls was 0.22 ppm, which is well below the lead TCLP State regulatory standard of 5.0 ppm.

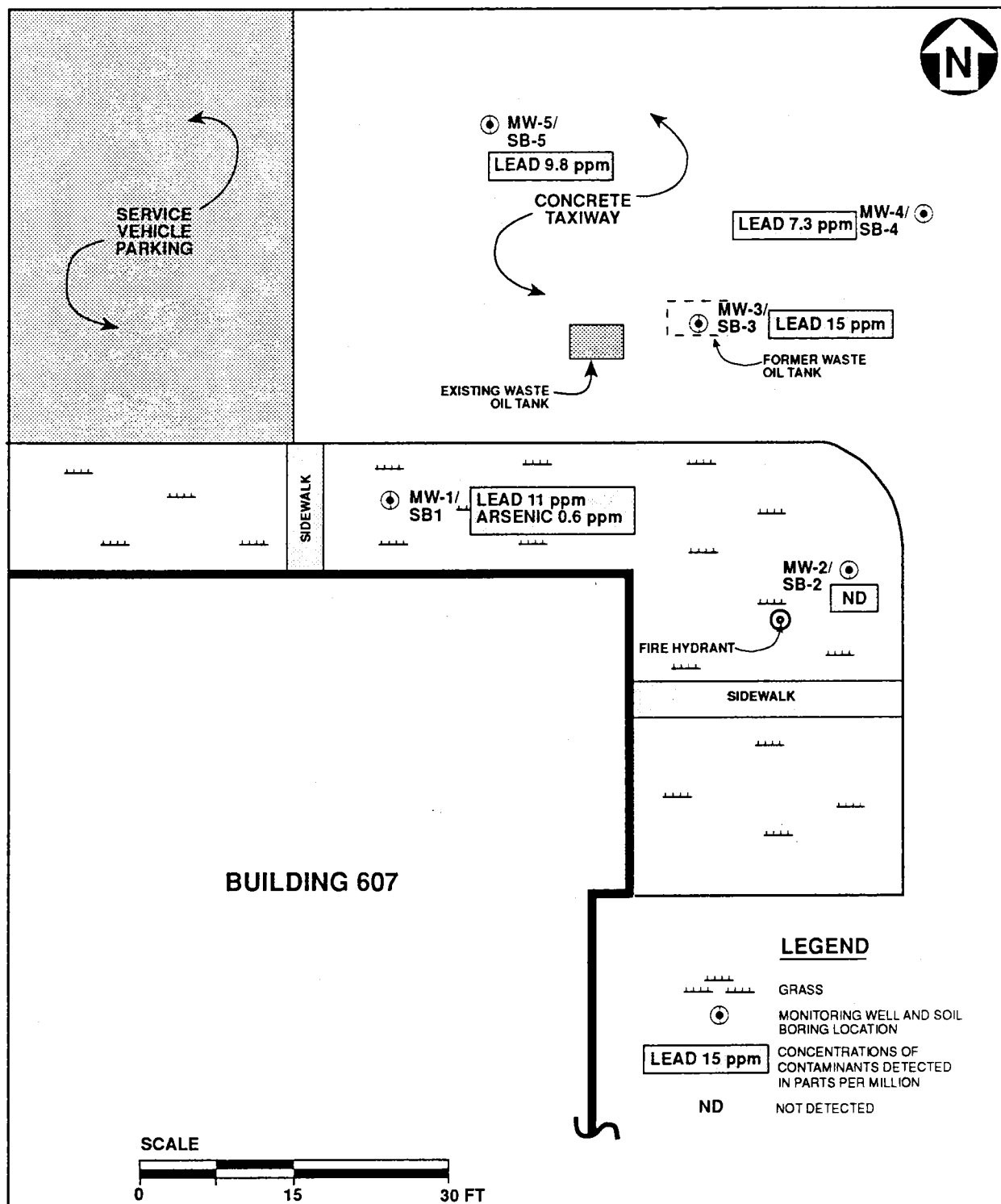


FIGURE 5-3

**SOIL CONTAMINATION DISTRIBUTION
JANUARY 23 & 24, 1992**



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Because: (1) no petroleum-contaminated soils were identified at the site, (2) total lead concentrations are well below State regulatory concentrations, and (3) much of the site area is paved inhibiting exposure to contaminated soils, it does not appear that soil contamination poses an environmental or health risk at the site.

5.2.2 Groundwater Assessment In some areas near NAS Pensacola, the surficial zone of the sand-and-gravel aquifer has been demonstrated to be hydraulically connected with the main producing zone of the sand-and-gravel aquifer, making potable water supplies susceptible to contamination in these areas (Roaza and others, 1991). For this reason, the surficial zone at NAS Pensacola will be herein treated as a Class G-II water source, and Class G-II State regulatory standards will be applied throughout this report.

Groundwater samples were collected from all site monitoring wells on February 6, 1992, and submitted to Wadsworth/Alert Laboratories for VOC analysis by USEPA Method 624, for base-neutral and acid extractable analysis by USEPA Method 625, for total metals analysis, and for TRPH analysis.

Laboratory analysis identified toluene, chloroform, acetone, and methylene chloride in the groundwater samples (Table 5-4; Figure 5-4). Methylene chloride was detected in all groundwater samples and was the only contaminant found in concentrations exceeding Class G-II State regulatory standards. Methylene chloride was the only contaminant detected in groundwater samples from monitoring wells PEN-607NE-MW3, PEN-607NE-MW4, and PEN-607NE-MW5. It was also detected in the equipment blank, the trip blank, and the laboratory blank at levels equal to or exceeding those found in the groundwater samples; hence, its presence in the groundwater samples may to be the result of laboratory contamination.

Table 5-4
Summary of Groundwater Sample Analyses
February 6, 1992

Contamination Assessment Report
Site 607NE, Naval Aviation Depot
Pensacola, Florida

Compound	Regula- tory Level	MW1	MW2	MW3	MW4	MW5	MW5 Duplicate	Equipment Blank	Trip Blank	Lab Blank
Chloroform	100	ND	3	ND	ND	ND	ND	ND	ND	ND
Methylene chloride	5	10	10	10	11	11	11	11	12	12
Toluene	50	3	ND	ND	ND	ND	ND	ND	ND	ND
Total VOA	50	3	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	¹ 700	38	ND	ND	ND	ND	ND	ND	NA	ND
TRPH	5	1	ND	ND	ND	ND	ND	ND	NA	ND

¹Guidance concentration recommended by FDER, February, 1989.

Notes: Duplicate sample collected from MW5.

All concentrations are in parts per billion, except TRPH, which is in parts per million.

ND = not detected.

NA = not analyzed.

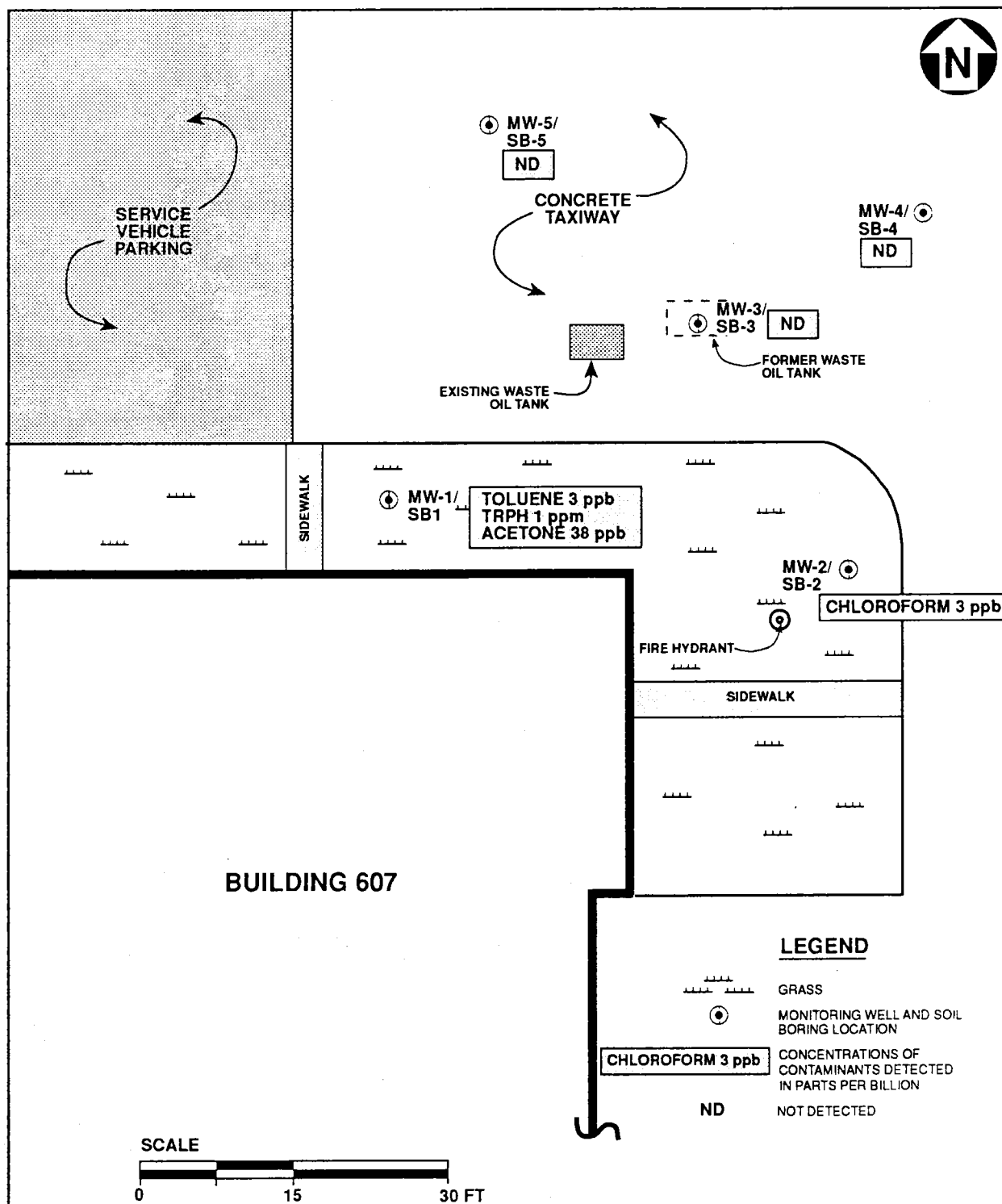


FIGURE 5-4

**GROUNDWATER CONTAMINATION
DISTRIBUTION
FEBRUARY 6, 1992**



**CONTAMINATION
ASSESSMENT REPORT
SITE 607 NE
NADEP PENSACOLA
PENSACOLA, FLORIDA**

Chloroform was detected in the sample from monitoring well PEN-607NE-MW2 at 3 parts per billion (ppb), which is below the State regulatory standard for chloroform of 100 ppb.

Other than the methylene chloride in all samples and the isolated incidence of chloroform in the sample from PEN-607NE-MW2, the only sample with contaminants detected in laboratory analysis was from monitoring well PEN-607NE-MW1. Toluene (at 3 ppb) and acetone (at 38 ppb) were identified, but were significantly below the State regulatory and guidance levels of 50 ppb and 700 ppb, respectively. TRPH was detected at 1 ppm, which is below the State regulatory level of 5 ppm. Seventeen additional compounds were also tentatively identified in the sample from PEN-607NE-MW1. These compounds and their estimated concentrations are presented in Table 5-5. The compounds tentatively identified are commonly used as fragrances or cleaning agents and do not appear to be related to a petroleum discharge at the site. The absence of these compounds in samples from the remaining site wells, which are downgradient, indicates that their presence in the sample from PEN-607NE-MW1 is not a major concern. Their presence may have been the result of dumping household cleansers (possibly mop water) on the grassy area near the well.

5.3 POTABLE WELL SURVEY. A potable well survey was conducted to assess the risk of contamination to potable water sources from activities at Site 607NE. No potable water supply sources were identified within a 0.25-mile radius of the site. Two potable supply wells (Figure 5-5) exist at NAS Pensacola (Wilkins and others, 1985). The NAS Pensacola system is used in conjunction with the Corry Field system, which is located approximately 2 miles north of NAS Pensacola. According to NADEP personnel, these wells are not currently used for potable water supply at NAS Pensacola, but are available as a reserve potable water supply should the need arise.

Potable well inventory data are presented in Table 5-6. Both potable wells at NAS Pensacola are screened in the main producing zone of the sand-and-gravel aquifer at depths ranging from 105 to 160 feet bls. Both wells are upgradient to Site 607NE, and are not located within a 0.25-mile radius of the site. Therefore, the possibility of contamination of potable water sources from activities at Site 607NE does not appear feasible.

Table 5-5
Estimated Concentrations of Tentatively Identified Compounds
Found in Samples from Well PEN-607NE-MW1
February 6, 1992

Contamination Assessment Report
Site 607NE, Naval Aviation Depot
Pensacola, Florida

Compound	Estimated Concentration (ppb)
4-Methyl-1-(1-methylethyl)cyclohexene	10
1-Methyl-4-(1-methylethyl)-1,3-cyclohexadiene	8
1-Methyl-3-(1-methylethyl) benzene	66
1-Methyl-4-(1-methylethyl)-1,4,cyclohexadiene	20
1-Methyl-4-(1-methylethylidene)	31
Methyl-(1-methylethenyl) benzene	3
1,3,3-Trimethyl-bicyclo [2.2.1] heptan-2-one	6
1,3,3-Trimethyl-bicyclo [2.2.1] heptan-2-ol	4
1-Methyl-4-(1-methylethenyl) cyclohexane,cis	9
Camphor	6
1-Methyl-4-(1-methylethyl) benzene	30
D-fenchyl alcohol	26
(2)-5-Hexenal oxime	56
Linalyl propionate	52
1-Borneol	45
3-Penten-2-ol	7
Unknown	19
Note: ppb = parts per billion.	

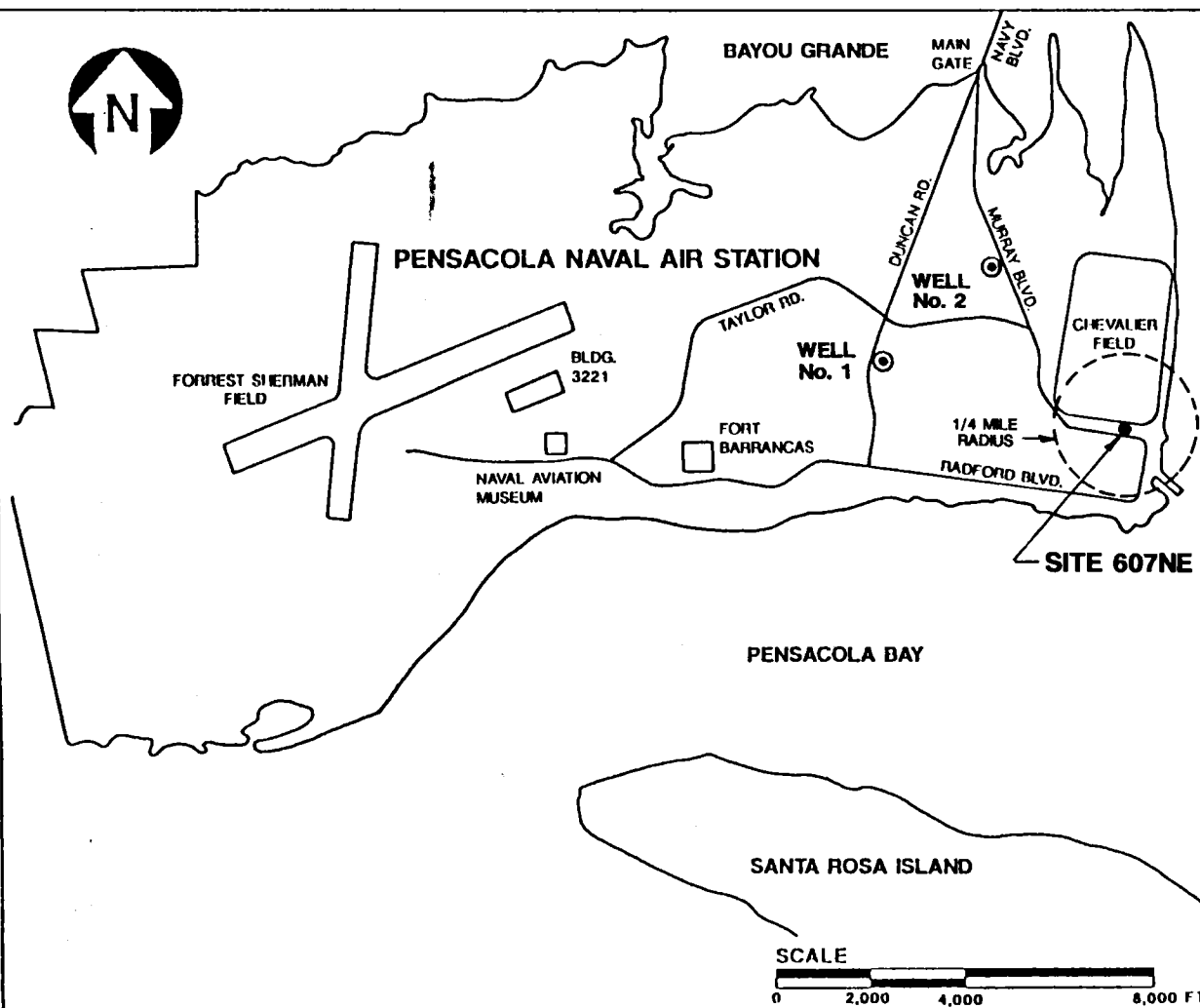
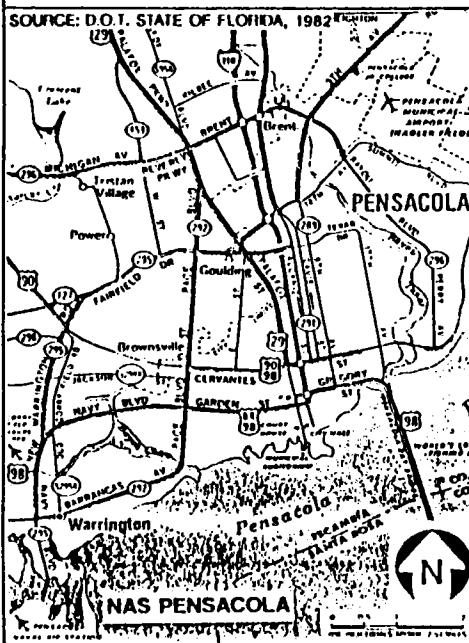
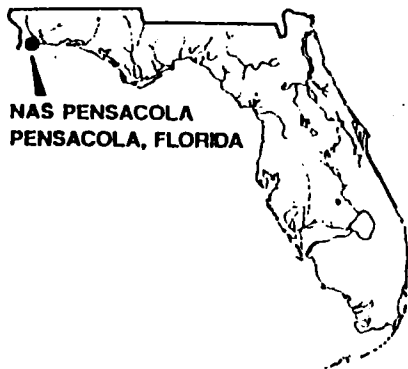


FIGURE 5-5
POTABLE WELL LOCATIONS



**CONTAMINATION
ASSESSMENT REPORT
SITE 607NE
NADEP PENSACOLA
PENSACOLA, FLORIDA**

Table 5-6
Potable Well Inventory Data
Naval Air Station, Pensacola Florida

Contamination Assessment Report
Site 607NE, Naval Aviation Depot
Pensacola, Florida

Well Identification Number/Local Name	Location	Total Depth (feet)	Screened Interval (feet)	Diameter Casing/Screen (inches)
302116087170201/No. 1	Sec. 1-T3S-R30W Duncan and Taylor Roads	174	105-160	24/12
302124087163601/No. 2	Sec. 1-T3S-R30W Murray and Farrar Roads	178	110-160	24/12

6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY. Based on the results of the field investigations and the laboratory analytical results collected during this investigation, the following is a summary of conditions at the site.

- The sediments encountered during drilling operations are predominantly comprised of very fine to fine grained quartz sands. These sediments are part of the surficial zone of the sand-and-gravel aquifer (Roaza and others, 1991).
- Groundwater beneath the site was encountered at depths of 4 to 6 feet bls and is classified as G-II.
- The direction of groundwater flow in the surficial zone is to the east.
- The average hydraulic gradient across the site is 2.1×10^{-3} ft/ft.
- The average hydraulic conductivity at the site is 7.2 ft/day.
- The average transmissivity is 5.8×10^1 ft²/day.
- The average pore water velocity is 6.0×10^{-2} ft/day.
- Petroleum contamination was not identified in any of the soil borings or monitoring wells during the field investigation.
- Lead and arsenic were the only soil contaminants identified at the site. Arsenic was detected in one sample at 0.6 ppm, which is below the FDER regulatory level for total arsenic in soils of 55 ppm. The highest concentration of lead detected during total metals analysis was 15 parts per million (ppm), which is below the FDER regulatory level for total lead in soils of 77 ppm. The TCLP lead value for the sample from SB3 at 4 to 6 feet bls was 0.22 ppm, which is well below the lead TCLP regulatory standard of 5.0 ppm.
- Much of the site area is paved, thus minimizing exposure to soils and any soil contamination at the site that might pose an environmental or health risk.
- Groundwater contaminants identified at the site include toluene, chloroform, and methylene chloride. Methylene chloride was the only contaminant identified in concentrations above regulatory levels, and its presence appears to be the result of laboratory contamination.
- Seventeen compounds were tentatively identified in the sample from monitoring well PEN-607NE-MW1. These compounds are commonly contained in cleaning and perfume solvents, and do not appear to be related to a petroleum discharge at the site.

- Because there are no potable water sources within a 0.25-mile radius of the site, there appears to be little chance for contamination of the public water supply system from activities at the site.

6.2 CONCLUSIONS. The level of soil and groundwater contamination identified at Site 607NE is minimal, is below regulatory standards, and is not expected to impact local potable water supplies on the base.

6.3 RECOMMENDATIONS. Based on the findings and interpretations of this contamination assessment, a *No Further Action Proposal (NFAP)* is herewith submitted.

7.0 PROFESSIONAL REVIEW CERTIFICATION

The contamination assessment contained in this report was prepared using sound hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report was developed for the waste oil tank located at Site 607NE at the Naval Aviation Depot, Naval Air Station in Pensacola, Florida, and should not be construed to apply to any other site.

Roger Durham
Professional Geologist
P.G. No. 001127

Date

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APPENDIX A
SITE CONDITIONS

Regional and Local Physiography

Florida is divided into four physiographic zones; the Coastal Lowlands, the Central Highlands, the Northern Highlands, and the Marianna Lowlands (Puri and Vernon, 1964). The Pensacola area lies entirely within the Coastal Lowlands zone, which closely parallels the Florida coastline. The Coastal Lowlands are further divided into the Atlantic, Distal, and Gulf Coastal Lowlands (Puri and Vernon, 1964). NADEP Pensacola falls within the Gulf Coastal Lowlands. The lowlands are characterized by poor drainage and elevations less than 100 feet above mean sea level. Landforms include barrier islands, estuaries, coastal ridges, dunes, and valleys (Puri and Vernon, 1964).

Land surface altitudes at NAS Pensacola range from sea level at the coast to greater than 30 feet above sea level. Surface drainage is variable, but is generally toward the nearest body of water.

Regional Hydrogeology

NADEP Pensacola is underlain by three water bearing zones. These zones include the sand-and-gravel aquifer, the Upper Floridan Aquifer, and the Lower Floridan Aquifer.

The sand-and-gravel aquifer is comprised of Pleistocene terrace deposits, the Pliocene Citronelle Formation (Marsh, 1966), and Miocene coarse clastics. These deposits extend from the surface to a depth of approximately 400 feet below land surface (bls) and are predominantly poorly sorted, fine-grained to coarse-grained sands interbedded with numerous layers of clay and gravel (up to 60 feet thick). There is great lithologic variability in these deposits. Clay lenses and the presence of hardpan layers within the sand-and-gravel aquifer result in the occurrence of perched water tables and artesian conditions in some areas (Musgrove and others, 1965). Groundwater flow is generally topographically controlled. Recharge to the aquifer is derived almost entirely from local rainfall. The sand-and-gravel aquifer is the sole source of potable groundwater in the Pensacola area (Roaza and others, 1991).

The sand-and-gravel aquifer is divided into three major zones: the surficial zone, the low permeability zone, and the main producing zone (Roaza and others, 1991). These designations are based on changes in permeability of the sediments comprising each zone. The surficial zone is the uppermost layer of the aquifer. It consists primarily of sand and gravel with occasional silt and clay deposits. This zone ranges in thickness from 0 to 150 feet (Roaza and others, 1981). The low permeability zone, which underlies the surficial zone, consists of various mixtures of clay, silt, sand, and gravel. Locally this zone contains poorly sorted sands, with gravel and some clay (Roaza and others, 1991). The thickness of the zone varies from 50 to 100 feet. Individual beds of the low permeability zone are highly discontinuous, and in some areas there may be hydraulic connection between the surficial zone and the main producing zone. The main producing zone is composed of moderate to well sorted sand-and-gravel beds that are typically interbedded with beds of fine sand and clay. Locally this zone typically contains medium-grained sands and sandy clays (Roaza and others, 1991). The thickness of the main producing zone ranges from 200 to 300 feet.

The Upper Floridan Aquifer is comprised of deposits correlative to the lower Miocene Tampa Formation and the upper Oligocene Chickasawhay Formation. These two formations are undifferentiated in the Pensacola area. Locally these deposits are approximately 380 feet thick (Marsh, 1966) and are typically brown to light gray, hard, fossiliferous dolomitic limestones or dolomites with a distinctive spongy-looking texture. Locally, the overlying Pensacola Clay is approximately 1,000 feet thick and forms an effective confining unit between the sand-and-gravel aquifer and the Upper Floridan aquifer (Marsh, 1966). This confining unit has also been designated as part of the Intermediate System (Roaza and others, 1991). The Upper Floridan aquifer is recharged by local rainfall in Conecuh, Escambia, and Monroe Counties, Alabama (Healy, 1980). General groundwater flow in the Upper Floridan aquifer is to the southeast toward the Gulf of Mexico (Barr, 1987). The groundwater in the Upper Floridan aquifer is mineralized in this area and is not used as a water supply.

The Lower Floridan aquifer is comprised of upper to middle Eocene limestones. The aquifer is approximately 500 feet thick in the vicinity (Marsh, 1966). The limestones are typically white to grayish cream, soft, and chalky. The Lower Floridan aquifer is confined from above by the Bucatunna Clay Member of the middle Oligocene Byram Formation and from below by gray shales and clays of middle Eocene age. The Bucatunna Clay, also called the Intermediate Zone, is approximately 170 feet thick in the vicinity (Musgrove and others, 1965). Groundwater flow in the aquifer is to the southeast toward the Gulf of Mexico (Healy, 1980). The water quality is poor because of high mineralization.

Local Hydrogeology

The surficial zone of the sand-and-gravel aquifer is the interval of primary concern at NAS Pensacola. The surficial zone extends from the surface to a depth of approximately 100 feet bls. Soils from 0 to 50 feet bls are generally composed of fine- to very fine-grained sands, with very little silt and clay. Occasional coarse-grained sands to fine-grained gravels were found with the fine- to very fine-grained sands, and thin peat layers were found at NAS Pensacola in the Sherman Field vicinity.

Groundwater in the surficial zone is non-artesian and is encountered at depths from less than 2 feet bls to greater than 20 feet bls at the NADEP facility. The depth to groundwater is mainly controlled by topography. Recharge is predominantly from local rainfall.

Figure A-1 shows the groundwater flow direction in the site vicinity on March 30, 1992. The direction of groundwater flow in the site vicinity is predominantly easterly, although variations in topography and the presence of surface water bodies result in localized changes in the groundwater flow direction. For example, groundwater flow is northerly at the north end of Chevalier Field and appears to be influenced by a creek that exists north of Building 3810. A southerly flow toward Pensacola Bay is indicated along Radford Avenue in the southwest area shown on Figure A-1. A westerly flow was observed near the 3557 Building area on the west edge of Chevalier Field. The presence of a drainage ditch along the west side of Industrial Road appears to be the cause of this phenomenon. The reversal of the predominantly eastern flow near Building 3557 results in an apparent piezometric "high" in the central part of Chevalier Field.

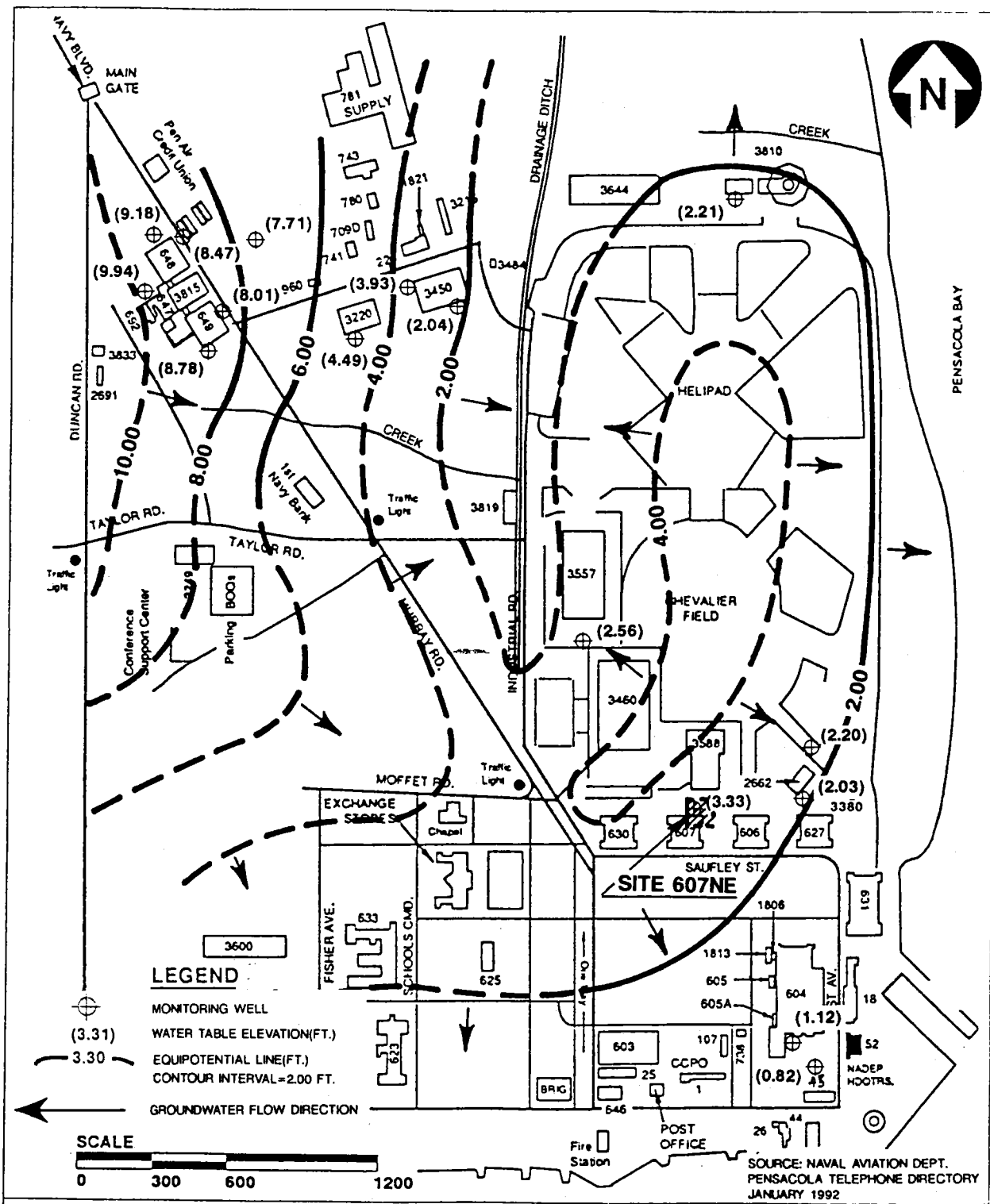


FIGURE A-1
WATER TABLE ELEVATION CONTOUR
MAP, SURFICIAL ZONE -
SAND AND GRAVEL AQUIFER
MARCH 30, 1992



CONTAMINATION
ASSESSMENT REPORT
SITE 607NE
NADEP PENSACOLA
PENSACOLA, FLORIDA

Perched water tables were observed in the Sherman Field area, approximately 2 miles west of the site, and are apparently the result of peat layers found in this area. Perched water tables were not observed in the site vicinity.

Locally, hydraulic gradients in the surficial zone vary from approximately 3×10^{-3} feet per foot (ft/ft) to 7×10^{-3} ft/ft. Gradients are generally less in the lower flat-lying areas than those in the topographically higher areas to the northwest of Chevalier Field. Additional water levels measurements, taken on numerous occasions at low-elevation sites located near Pensacola Bay, indicate that tidal fluctuations do not appear to alter the groundwater flow direction and do not appear to significantly affect the hydraulic gradients observed at NAS Pensacola.

Slug tests performed on select wells at the 18 sites at the NADEP facility indicate that the sediments of the surficial zone are highly conductive and transmissive. Table A-1 summarizes results of the slug tests. Hydraulic conductivities in the surficial zone at NAS Pensacola were found to vary from approximately 7 feet per day (ft/day) to 1×10^2 ft/day. Transmissivities vary from approximately 6×10^1 feet² per day (ft²/day) to 6×10^2 ft²/day.

Table A-1
Average Hydraulic Conductivities and Transmissivities
and Well Information for Various Wells

Contamination Assessment Report
Site 607NE, Naval Aviation Depot
Pensacola, Florida

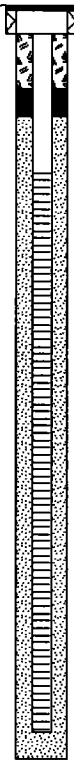
Site/Well Number	Total Depth	Screened Interval (feet)	Depth to H ₂ O	b(feet)	K(ft/day)	T(ft ² /day)
PEN-604S-12D	31.71	26.71 - 31.71	6.28	5.00	3.2 x 10 ⁻¹	1.6 x 10 ²
PEN-604S-6	13.00	3.00 - 13.00	7.76	5.24	2.1 x 10 ⁻¹	1.1 x 10 ²
PEN-604S-11	13.45	3.45 - 13.45	5.95	7.50	3.3 x 10 ⁻¹	2.5 x 10 ²
PEN-607NE-5	12.87	2.87 - 12.87	4.75	8.12	0.7 x 10 ⁻¹	5.7 x 10 ²
PEN-607N-2	26.63	16.63 - 26.63	19.46	7.17	2.5 x 10 ⁻¹	1.8 x 10 ²
PEN-647N-8D	40.05	35.05 - 40.05	20.16	5.00	5.7 x 10 ⁻¹	5.7 x 10 ²
PEN-648N-3	26.95	16.95 - 26.95	19.55	7.40	2.8 x 10 ⁻¹	2.1 x 10 ²
PEN-648N-5D	50.48	45.48 - 50.48	20.51	5.00	9.0 x 10 ⁻¹	4.5 x 10 ²
PEN-648N-6	27.01	17.01 - 27.01	19.28	7.73	3.0 x 10 ⁻¹	2.3 x 10 ²
PEN-648N-9	27.67	17.67 - 27.67	18.28	9.39	1.8 x 10 ⁻¹	1.7 x 10 ²
PEN-649W-1	25.75	15.75 - 25.75	17.93	7.82	2.9 x 10 ⁻¹	2.3 x 10 ²
PEN-649W-6D	40.63	35.63 - 40.63	19.04	5.00	7.6 x 10 ⁻¹	3.8 x 10 ²
PEN-649N-8	26.78	16.78 - 26.78	18.28	8.50	0.7 x 10 ⁻¹	0.6 x 10 ²
PEN-649N-4D	36.78	31.78 - 36.78	18.98	5.00	4.0 x 10 ⁻¹	2.0 x 10 ²
PEN-709DN-6D	34.50	29.50 - 34.50	17.47	5.00	6.8 x 10 ⁻¹	3.4 x 10 ²
PEN-709DN-10	25.08	15.08 - 25.08	18.71	6.37	2.6 x 10 ⁻¹	1.7 x 10 ²
PEN-709DN-3	25.15	15.15 - 25.15	17.15	8.00	3.7 x 10 ⁻¹	3.0 x 10 ²
PEN-2662W-1	¹ 12.00	2.00 - 12.00	2.52	9.48	4.8 x 10 ⁻¹	4.6 x 10 ²
PEN-2662W-2	¹ 12.00	2.00 - 12.00	3.98	8.02	4.4 x 10 ⁻¹	3.5 x 10 ²
PEN-3220S-9D	45.27	40.27 - 45.27	18.90	5.00	4.6 x 10 ⁻¹	2.3 x 10 ²
PEN-3220S-6	27.55	17.55 - 27.55	19.33	8.22	2.4 x 10 ⁻¹	2.0 x 10 ²
PEN-3221SW-1	14.91	4.91 - 14.91	7.45	7.46	4.0 x 10 ⁻¹	3.0 x 10 ²
PEN-3221NW-1	14.85	4.85 - 14.85	5.17	9.68	4.1 x 10 ⁻¹	4.0 x 10 ²
PEN-3221NE-9	14.98	4.98 - 14.98	9.89	5.09	3.0 x 10 ⁻¹	1.5 x 10 ²
PEN-3221NE-6	14.86	4.86 - 14.86	6.74	8.12	4.3 x 10 ⁻¹	3.5 x 10 ²
PEN-3221NE-10	15.02	5.02 - 15.02	9.00	6.02	2.6 x 10 ⁻¹	1.6 x 10 ²
PEN-3221NE-12D	34.69	29.69 - 34.69	9.75	5.00	1.0 x 10 ⁻¹	5.2 x 10 ²
PEN-3450S-2	24.90	14.90 - 24.90	18.20	6.70	2.0 x 10 ⁻¹	1.3 x 10 ²
PEN-3450W-1	25.55	15.55 - 25.55	17.00	8.55	2.2 x 10 ⁻¹	1.9 x 10 ²
PEN-3557S-1	13.00	3.00 - 13.00	4.07	8.93	1.7 x 10 ⁻¹	1.5 x 10 ²
PEN-3810N-10D	19.65	14.65 - 19.65	5.36	5.00	8.3 x 10 ⁻¹	2.8 x 10 ²
PEN-3810N-4	13.00	3.00 - 13.00	4.64	8.36	5.5 x 10 ⁻¹	4.6 x 10 ²
PEN-3810N-6	13.00	3.00 - 13.00	6.22	6.78	4.9 x 10 ⁻¹	3.3 x 10 ²

¹Estimated depth.

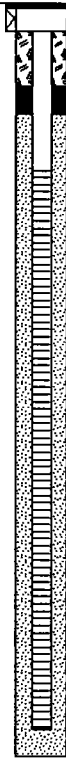
Notes: b = aquifer test interval.
K = hydraulic conductivity.
T = transmissivity.

APPENDIX B
LITHOLOGIC LOGS

TITLE: NADEP Pensacola				LOG of WELL: 607NE MW-1		BORING NO. SBI	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/23/92		COMPLTD: 1/23/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 10'		PROTECTION LEVEL: D	
TOC ELEV.: 9.12 FT.		MONITOR INST.: Porta Fid/GC		TOT DPTH: 13FT.		DPTH TO ∇: 5.32 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/23/92				SITE: NADEP Pensacola	

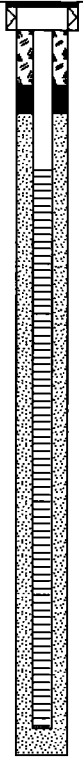
DEPTH F.T.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				SAND: Light gray to tan, fine to medium grained, some silt and clay.		SP		
5			0	SAND: Orange-brown to tan, very fine to fine grained.		SP	1,2,1,2	
10			0	SAND: Brown to brown-gray, very fine to fine grained, wet.		SP	5,8,15,15	
15								
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 607NE MW-2		BORING NO. SB2	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/23/92		COMPLTD: 1/23/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 10'		PROTECTION LEVEL: D	
TOC ELEV.: 8.91 FT.		MONITOR INST.: Porta Fld/GC		TOT DPTH: 13FT.		DPTH TO ∇: 5.22 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/23/92				SITE: NADEP Pensacola	

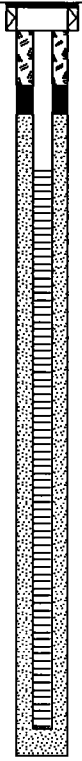
DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				SAND: Yellow-brown, very fine to fine grained.		SP		
				SAND: White, very fine to fine grained.		SP		
5		14/24	0	SAND: White to light brown, very fine to fine grained.		SP	3,8,7,11	
10		24/24		SAND: White to light gray, very fine to fine grained, wet.		SP	12,17,30,24	
15								
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 607NE MW-3		BORING NO. SB3	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/23/92		COMPLTD: 1/23/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 10'		PROTECTION LEVEL: 0	
TOC ELEV.: 8.30 FT.		MONITOR INST.: Porta Fid/GC		TOT DPTH: 13FT.		DPTH TO V: 4.58 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/23/92				SITE: NADEP Pensacola	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					SAND: Light gray to tan, fine to medium grained.		SP		
5	SB3 (4-6)		18/24	0	SAND: As above, damp.		SP	1,2,2,1	
10			24/24		SAND: As above, saturated.		SP	9,15,17,20	
15									
20									
25									



TITLE: NADEP Pensacola				LOG of WELL: 607NE MW-4		BORING NO. SB4	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/23/92		COMPLTD: 1/23/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 inch		SCREEN INT.: 10'		PROTECTION LEVEL: 0	
TOC ELEV.: 8.38 FT.		MONITOR INST.: Porta Fld/GC		TOT DPTH: 13FT.		DPTH TO ∇: 4.87 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/23/92				SITE: NADEP Pensacola	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				SAND: Brown-gray to gray-white, very fine to fine grained.		SP		
5			13/24	SAND: Off-white, very fine to fine grained.		SP	5,7,9,8	
10			23/24	SAND: As above.		SP	9,18,30,24	
15								
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 607NE MW-5		BORING NO. SB5	
CLIENT: SOUTHNAVAFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/24/92		COMPLTD: 1/24/92	
METHOD: 4.25" ID HSA		CASE SIZE: 2 Inch		SCREEN INT.: 10'		PROTECTION LEVEL: 0	
TOC ELEV.: 8.29 FT.		MONITOR INST.: Porta Fid/GC		TOT DPTH: 13FT.		DPTH TO V: 4.52 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/23/92				SITE: NADEP Pensacola	

DEPTH F.T.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0				SAND: Light gray to tan, fine to medium grained.		SP		
5		18/24		SAND: Light gray, fine to medium grained, some black silt.		SP	2,3,3,4	
10		16/24		SAND: Light grayish-brown, very fine to fine grained, wet.		SP	15,24,27,22	
15								
20								
25								

APPENDIX C

INVESTIGATIVE METHODOLOGIES AND PROCEDURES

Soil Boring Methods

Boreholes were advanced using 4.25-inch inside diameter, hollow-stem augers using a rotary drill rig. Soil samples were collected from each borehole using a Standard Penetration Test (SPT) split-spoon sampler. SPT samples were generally collected at 5-foot intervals to the total depth of the well. The soil samples collected above the water table were placed in 16-ounce glass jars and head space analyses were performed using an organic vapor analyzer (OVA) with a flame ionization detector (FID) following Florida Department of Environmental Regulation (FDER) Chapter 17-770.200(2), Florida Administrative Code (FAC) guidelines. Samples from below the water table were analyzed using a portable gas chromatograph (GC) calibrated to detect benzene, ethyl benzene, toluene, and xylene (BETX) to the part per billion (ppb) level. The purpose of the screening procedure was to optimize monitoring well placement during the investigation.

Monitoring Well Construction

Monitoring wells were installed in many of the boreholes drilled at the NADEP facility. All monitoring wells installed during the investigation were constructed of 2-inch inner diameter, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 0.010-inch machine-slotted screen. Shallow wells were constructed with 10 feet of screen. Deeper wells were constructed with 5 feet of screen. PVC well casings extend from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 2 to 3 feet above the top of the screen. A 1- to 2-foot thick bentonite seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout. A protective traffic-bearing vault was installed to complete each well location. In concreted areas, the well pad consisted of a 6-inch thick reinforced concrete around the traffic-bearing vault to the depth of the surrounding concrete. Each monitoring well is equipped with a locking well cap and a padlock. Figure C-1 depicts a typical shallow monitoring well installation for the site.

Water Level Measurements

The groundwater levels were measured using an electric water level indicator and an engineering tape divided into increments of 0.01 foot. The wells were checked for the presence of free product by visual observation of a groundwater sample taken from each well using an extruded Teflon™ bailer. Water level elevations were calculated by subtracting the measured depth to groundwater from the elevation at the top of the well casing.

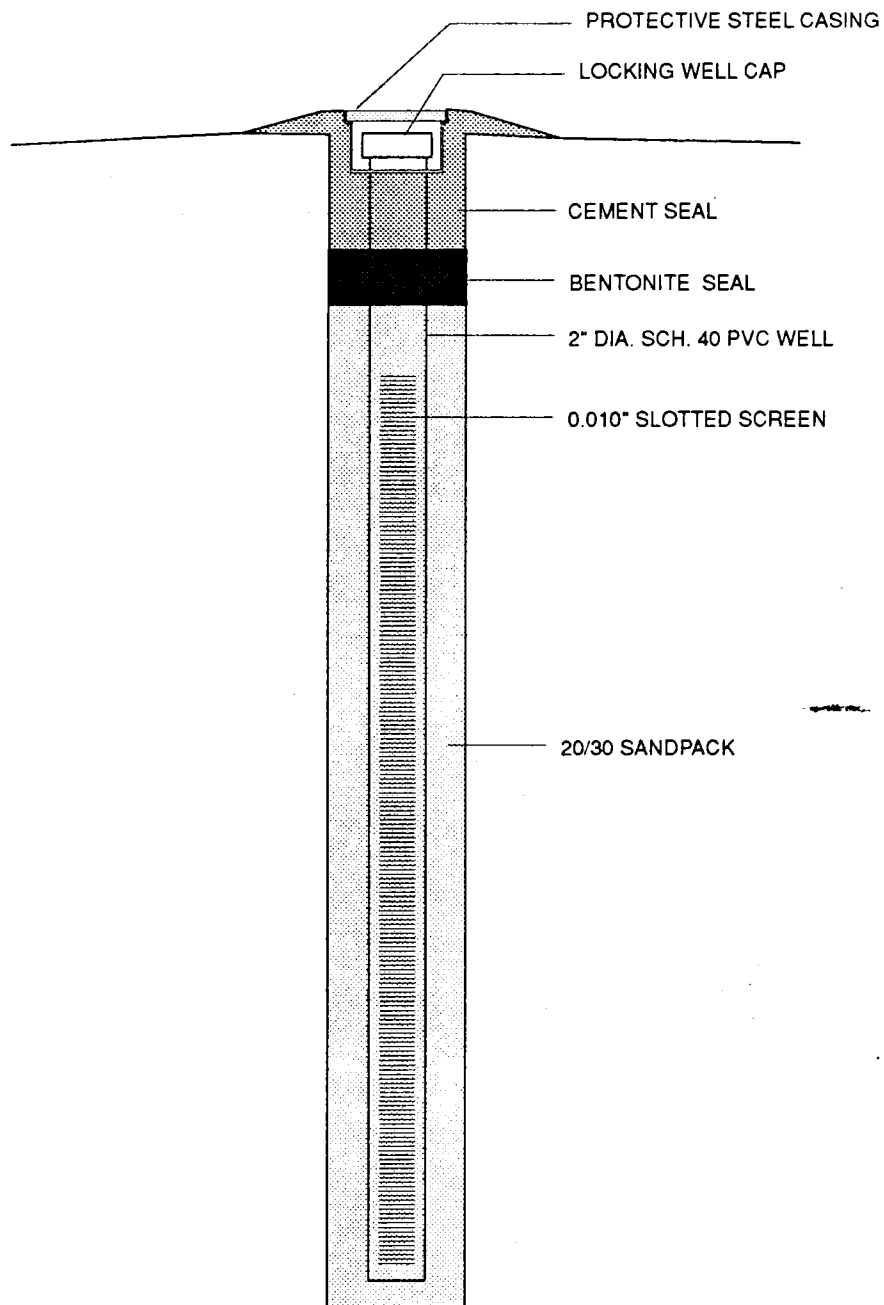


FIGURE C-1
MONITORING WELL
CONSTRUCTION DIAGRAM



CONTAMINATION
ASSESSMENT REPORT
SITE 607 NE
NADEP PENSACOLA
PENSACOLA, FLORIDA

Groundwater Sampling

The groundwater samples were collected in accordance with ABB Environmental Services, Inc. (ABB-ES), FDER-approved Comprehensive Quality Assurance Plan (CompQAP). The monitoring wells were purged with a Teflon™ bailer. Purging continued until a minimum of three well volumes had been removed from the well. Groundwater samples were collected using an extruded Teflon™ bailer. The samples were placed into appropriate containers, properly preserved, and placed on ice. Conductivity, pH, and temperature were measured at the time of sampling. Samples were then shipped to Wadsworth/Alert Laboratories in Tampa, Florida. All groundwater samples collected were analyzed for waste oil/unknown constituents as outlined in FDER Chapter 17-770, FAC.

Slug Test Procedures

The slug test developed by Bouwer and Rice (1976) permits the measurement of saturated hydraulic conductivity (K) with a single well. The test method used is known as a rising head test and is performed by quickly withdrawing a volume of water (slug) from the well and measuring the subsequent rate of rise of the water level in the well. Bouwer (1989) recommends the rising head slug test for wells with screened intervals that are only partially submerged into unconfined aquifers.

The slug was constructed of 1-inch outside diameter PVC pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells were recorded with a data logger and pressure transducer. The pressure transducer was suspended just above the bottom of the well and an initial water level was recorded prior to beginning the test. The slug was then lowered into the well until it was totally submerged beneath the water table. Water levels were then observed until recovery to the original level. Generally, recovery occurred within 3 to 4 seconds. Following stabilization, the slug was quickly removed with water level measurements recorded over time until the water level returned to the original level. Three rising head tests were conducted for each well in order to obtain an average recovery response.

APPENDIX D
AQUIFER PARAMETER CALCULATIONS

Aquifer Parameter Calculations

Hydraulic gradient

Water table elevations were plotted on a scaled water table contour map where flow lines (depicting groundwater flow direction) were drawn perpendicular to the groundwater elevation contours. The groundwater hydraulic gradient was calculated by subtracting the differences in groundwater elevation (in feet) between two points on the map and dividing the elevation difference by the distance between two points to obtain a resulting gradient in feet per foot. Water elevation data collected on February 6 and March 31, 1992, were used to calculate hydraulic gradients at the site. For each date, three traverses were made perpendicular to equipotential contour lines to calculate an average site hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = \frac{(h_1 - h_2)}{d} \quad (1)$$

where

- i = hydraulic gradient (feet per foot [ft/ft]),
- h^1 = water table elevation, upgradient (feet),
- h_2 = water table elevation, downgradient (feet), and
- d = horizontal distance between h_1 and h_2 (feet).

Hydraulic gradients calculated in this manner varied from 1.7×10^{-3} ft/ft to 2.4×10^{-3} ft/ft. The average hydraulic gradient at the site was calculated to be 2.1×10^{-3} ft/ft.

Hydraulic conductivity

Hydraulic conductivity from data gathered in the slug tests was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information was needed to assess the hydraulic conductivity:

- radius of well (r_c),
- r_w (r_c plus thickness of the sand pack surrounding the well screen),
- length of screened interval below water table (L_e),
- effective well radius (r_e),
- static water table,
- depth of well below water table (L_w),

- depth to confining unit or bottom of aquifer below the static water, table (H), and
- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure D-1 is a well diagram depicting many of the above listed parameters. Calculations were made assuming that $L_w < H$. Hydraulic conductivity, K, was calculated from the above parameters as follows:

$$K = [(R_c^2 \ln(\frac{r_e}{r_w})) - 2L_e] [(\frac{1}{t}) \ln(\frac{y_0}{y_t})] \quad (2)$$

where

y_0 = y at time zero, and
 y_t = y at time t.

The effective well radius, r_e , and the term $((1/t) \ln (y_0/y_t))$ were derived by using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is the hydraulic conductivity, K.

Three slug tests were performed for well PEN-607NE-5. Hydraulic conductivity, K, is reported in feet per minute (ft/min) on the slug test graphs, and was recalculated to feet per day (ft/day). K was found to vary from 6.2 ft/day to 7.9 ft/day with an average K of 7.2 ft/day.

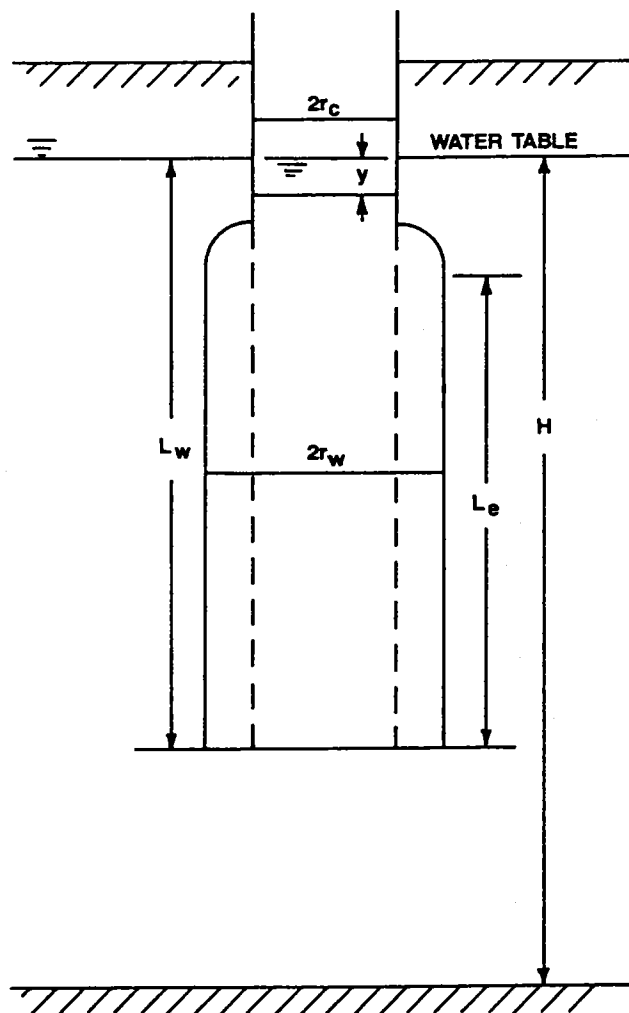
Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

$$V = \frac{(K \cdot I)}{n} \quad (3)$$

where

V = discharge (velocity),
 K = hydraulic conductivity in ft/day,
 I = hydraulic gradient, and
 n = estimated porosity.



- r_c -radius of well.
- r_w -radius of well + total thickness of the sand/gravel pack.
- L_e -length of screened interval below the water table.
- L_w -depth of well below water table.
- H -depth to confining unit below the water table.
- y -difference between static water level outside well and water level inside well.

FIGURE D-1
DEFINITIONS OF SLUG TEST
PARAMETERS(from Bouwer, 1989)



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PENSACOLA, FLORIDA

Assuming an estimated porosity of 25 percent, an average hydraulic gradient of 2.1×10^{-3} , and an average hydraulic conductivity of 7.2 ft/day, the average pore water velocity is calculated as follows:

$$v = \frac{7.2 \text{ ft/day} * 2.1 \times 10^{-3} \text{ ft/ft}}{0.25}$$

$$V = 6.0 \times 10^{-2} \text{ ft/day}$$

Transmissivity

To calculate a transmissivity value from the slug test results, the following formula was used:

$$T = K * b \quad (4)$$

where

T = transmissivity in square feet per day (ft²/day),

K = hydraulic conductivity in ft/day, and

b = aquifer test interval (thickness in feet of water in screened interval).

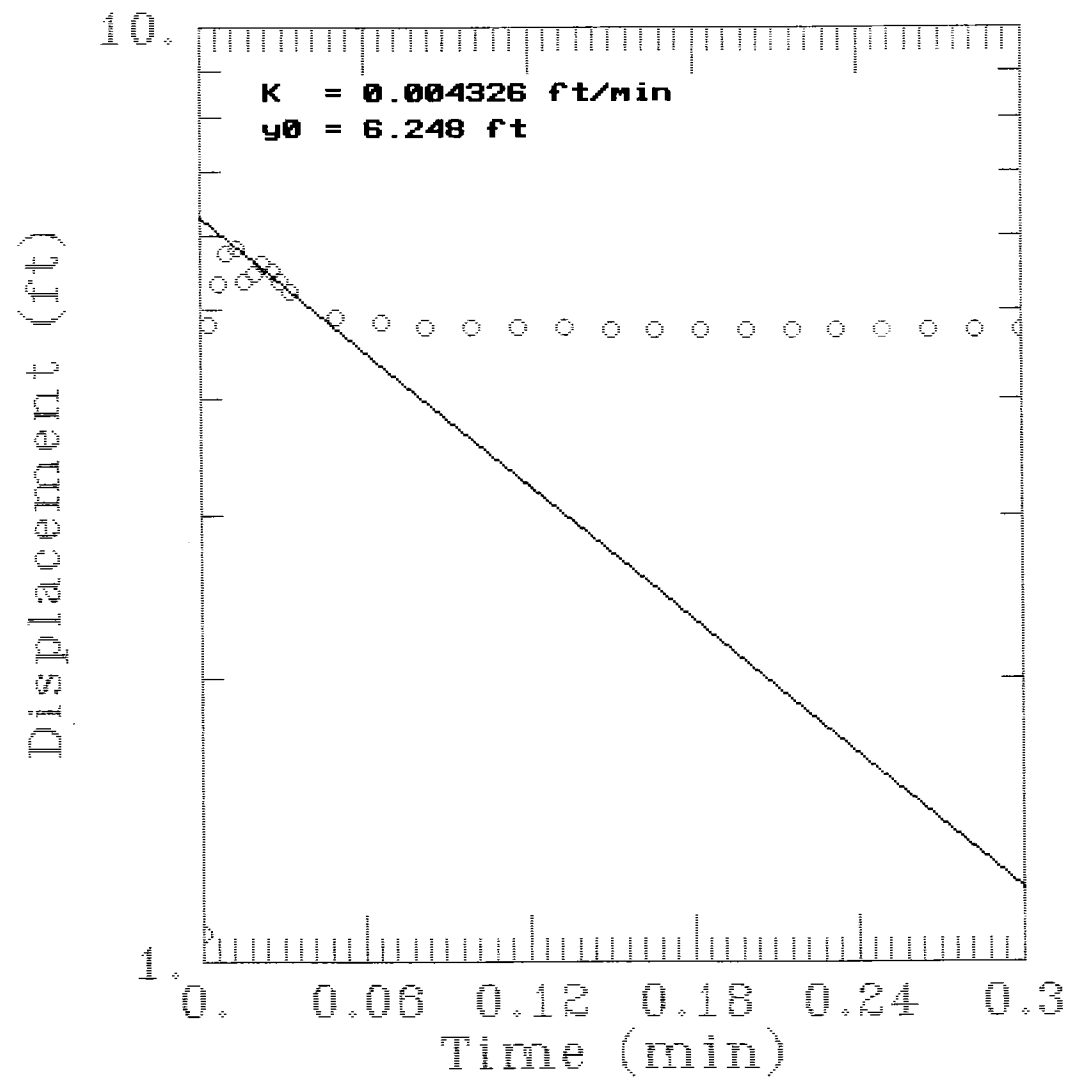
Based on the slug test data collected from monitoring well PEN-607NE-5, the calculation for T is as follows:

$$T = 7.2 \text{ ft/day} * 8.12$$

$$T = 5.8 \times 10^1 \text{ ft}^2/\text{day}$$

SLUG TEST PLOTS

607NE MW-5 RUN #1



AQTESOLV

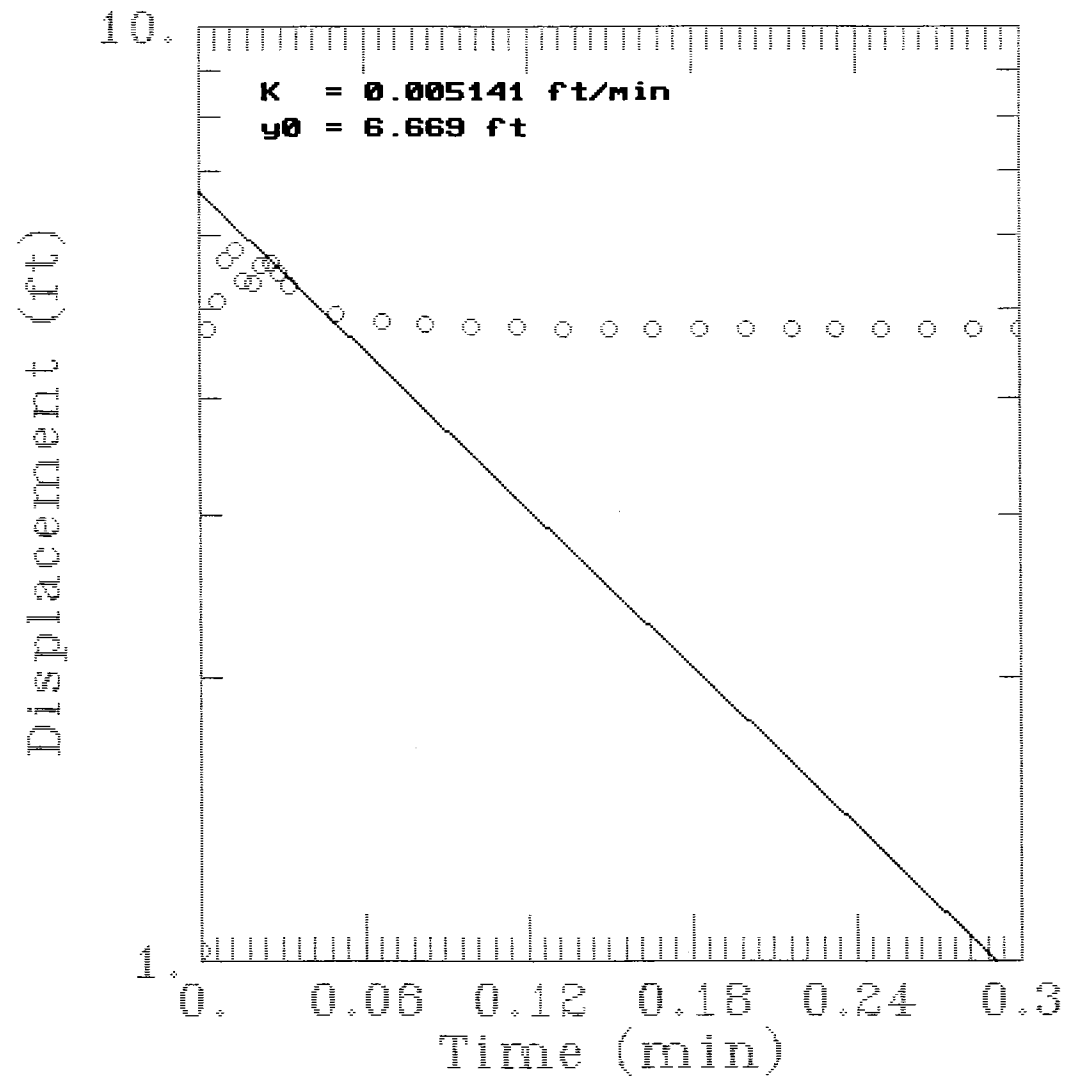


GERAGHTY
& MILLER, INC.



Modeling Group

607NE MW-5 RUN #2

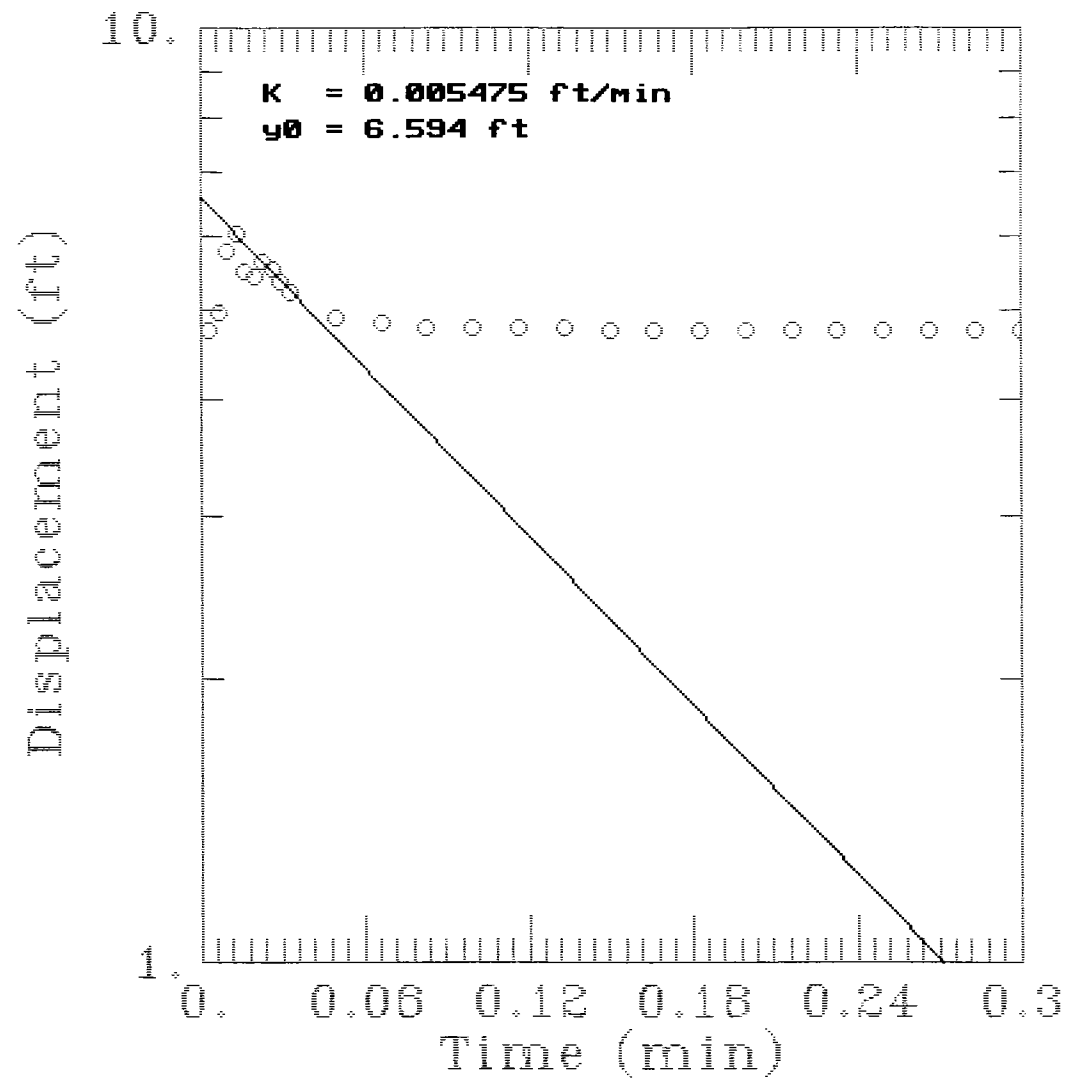


AQTESOLV



Modeling Group

607NE MW-5 RUN #3



AQTESOLV



GERAGHTY
& MILLER, INC.



Modeling Group

APPENDIX E
LABORATORY ANALYTICAL DATA

SOIL SAMPLE ANALYSES

GROUNDWATER SAMPLE ANALYSES

CONTAMINATION ASSESSMENT REPORT

**SITE 3221NE
NAVAL AVIATION DEPOT
NAVAL AIR STATION
PENSACOLA, FLORIDA**

UIC: N00204

Contract No. N62467-89-D-0317

Prepared by:

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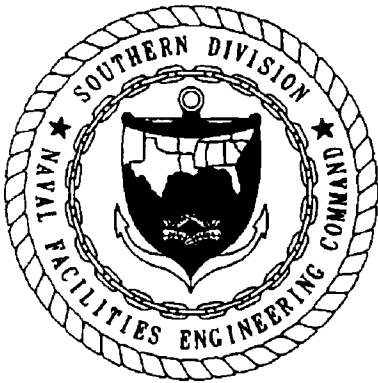
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August 1992



FOREWORD

Subtitle I of the Hazardous and Solid Waste Amendments (HSWA) of 1984 to the Solid Waste Disposal Act (SWDA) of 1965 established a national regulatory program for managing underground storage tanks (USTs) containing hazardous materials, especially petroleum products. Hazardous wastes stored in USTs were already regulated under the Resource Conservation and Recovery Act (RCRA) of 1976, which was also an amendment to SWDA. Subtitle I requires that the U.S. Environmental Protection Agency (USEPA) promulgate UST regulations. The program was designed to be administered by the individual States, who were allowed to develop more stringent standards, but not less stringent standards. Local governments were permitted to establish regulatory programs and standards that are more stringent, but not less stringent than either State or Federal regulations. The USEPA UST regulations are found in the Code of Federal Regulations, Title 40, Part 280 (40 CFR 280) (*Technical Standards and Corrective Action Requirements for Owners and Operators of Underground Storage Tanks*) and Title 40 CFR 281 (*Approval of State Underground Storage Tank Programs*). Title 40 CFR 280 was revised and published on September 23, 1988, and became effective December 22, 1988.

The Navy's UST program policy is to comply with all Federal, State, and local regulations pertaining to USTs. This report was prepared to satisfy the requirements of the Florida Department of Environmental Regulation (FDER) Chapter 17-770, Florida Administrative Code (FAC) (*State Underground Petroleum Environmental Response*) regulations on petroleum contamination in Florida's environment as a result of spills or leaking tanks or piping.

Questions regarding this report should be addressed to the Environmental Coordinator, Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, at 904-452-2320, or to Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM), Code 1843, at DSN 563-0613 or 803-743-0613.

EXECUTIVE SUMMARY

During an underground storage tank (UST) removal program conducted by the U.S. Navy in 1989 and 1990, 18 sites at the Naval Aviation Depot (NADEP), Naval Air Station, Pensacola, Florida, were identified as having soil contamination exceeding State regulatory standards for total recoverable petroleum hydrocarbons (TRPH). ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) for each of the 18 sites.

Site 3221NE is the former location of a 500-gallon UST. The UST was reportedly used for waste fuel and waste oil storage. The UST was installed in 1967, and was located approximately 400 feet north of the northeast corner of Building 3221, which is located on the eastern perimeter of Forrest Sherman Air Field. The UST was removed from the site during the tank removal program.

Soil borings and monitoring wells were placed at the site during the CA to assess the degree of soil and groundwater contamination (see Executive Summary Figure). Soil and groundwater samples were collected and analyzed for appropriate parameters. Locations of soil borings and monitoring wells and laboratory analytical results are summarized in the Executive Summary Figure. The findings, conclusions, and recommendations of this CA are summarized below.

Findings

- The net groundwater flow direction at the site is to the north.
- No excessively petroleum-contaminated soils were identified by organic vapor analyzer (OVA) headspace analysis. Only one OVA measurement exceeded the State standard of 10 parts per million (ppm) for "clean" soil.
- Low concentrations of lead and chromium were identified in soils at the site. Total metals concentrations for lead and chromium were below State regulatory standards.
- Contaminants detected in groundwater samples that exceeded State regulatory standards for Class G-II groundwater are methylene chloride, trichloroethene, and total volatile organic aromatics (VOA). Total VOA is the sum of benzene, ethylbenzene, toluene, and xylenes. Trichloroethene and total VOA concentrations exceeded State regulatory standards in only the samples collected from monitoring well PEN-3221NE-MW10. These compounds were not detected in the farthest downgradient site wells. Concentrations of methylene chloride exceeded State regulatory standards in samples collected from four site wells. However, methylene chloride was detected in the laboratory blank associated with the groundwater analyses, and is believed to be the result of laboratory contamination.

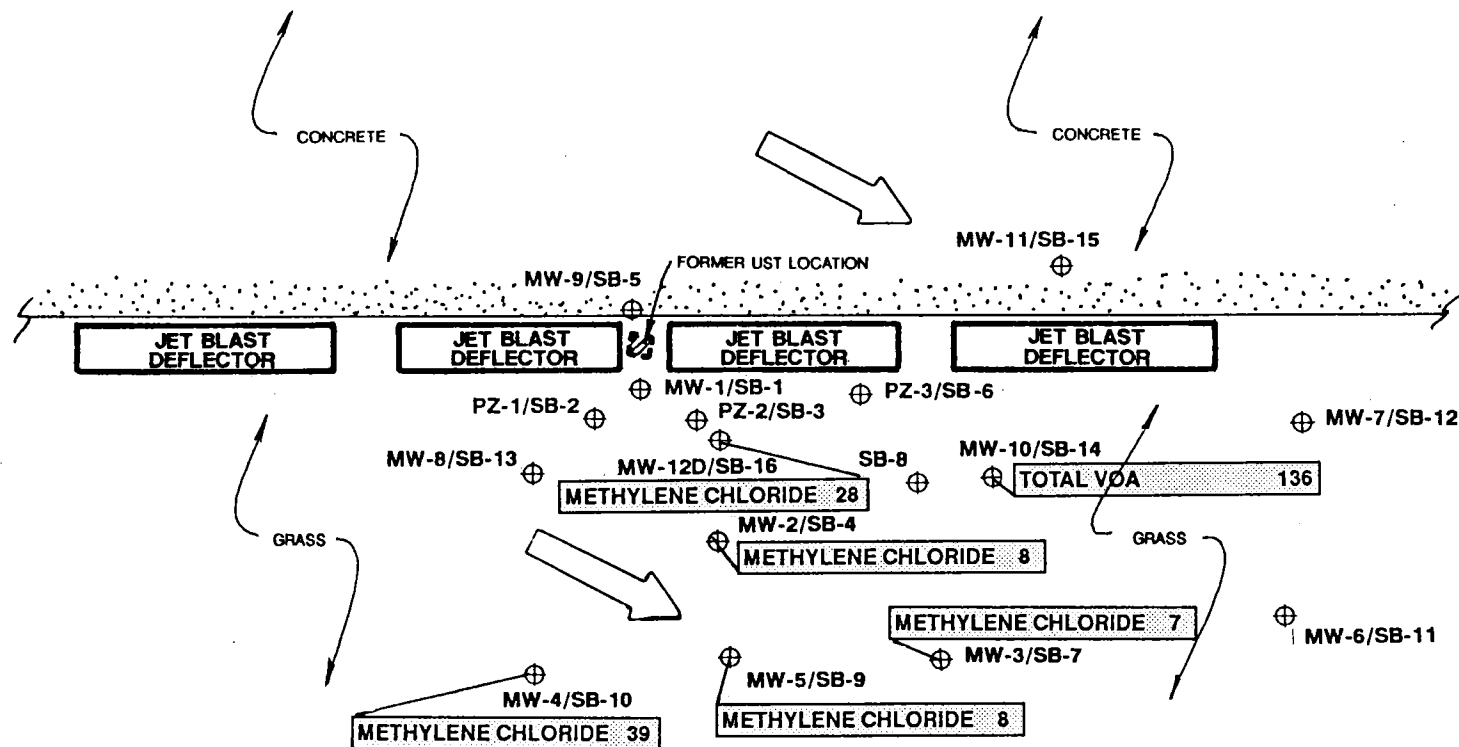
- A combined 39 additional compounds were tentatively identified in groundwater samples collected from five site wells. The tentatively identified compounds appear to be probable fuel constituents or fuel breakdown products. These compounds were not detected in downgradient wells at the site.
- No potable wells were identified within a 0.25-mile radius of the site.

Conclusions

- The level of soil contamination found at the site appears to be minimal, and is below State regulatory standards.
- The level of groundwater contamination found at the site appears to be minimal, except in the vicinity of monitoring well PEN-3221NE-MW10. Contaminants detected in concentrations exceeding State regulatory standards do not appear to be migrating off the site, and are not expected to affect potable water supplies at the base.

Recommendations

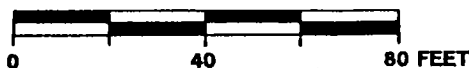
Based on the findings and conclusions of the CAR, *A Monitoring Only Plan (MOP)* is recommended for site 3221NE. This plan recommends the quarterly groundwater sampling of all site monitoring wells. Groundwater samples would be analyzed for constituents of the waste oil group as outlined in Section 6.3 of this report. It is recommended that monitoring continue for a period of 1 year, or until contaminant concentrations decrease to levels acceptable to the State regulatory agency.



LEGEND

- ⊕ MONITORING WELL/PIEZOMETER/SOIL BORING LOCATION
- CONCENTRATIONS (ppb)
- GROUNDWATER FLOW DIRECTION

SCALE



EXECUTIVE SUMMARY FIGURE



CONTAMINATION
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ACKNOWLEDGMENTS

In preparing this report, The Underground Storage Tank Section of the Comprehensive Long-Term Environmental Action, Navy (CLEAN) Group at ABB Environmental Services, Inc. (ABB-ES), commends the support, assistance, and cooperation provided by the personnel of the Naval Aviation Depot (NADEP), Pensacola, Florida, and Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM). In particular, ABB-ES acknowledges the effort provided by the following people during the investigation and preparation of this report.

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Luis Vazquez	Environmental Engineer	Engineer-in-Charge	SOUTHNAVFACENGCOM
Danny Freeman	Environmental Coordinator	Environmental Coordinator	NADEP Pensacola

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- Appendix C: Investigative Methodologies and Procedures
- Appendix D: Aquifer Parameter Calculations
- Appendix E: Laboratory Analytical Data

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GLOSSARY

The following list contains many of the acronyms, initialisms, abbreviations, and units of measure used in this report.

ABB-ES	ABB Environmental Services, Inc.
BETX	benzene, ethyl benzene, toluene, and xylenes
bls	below land surface
CA	Contamination Assessment
CAP	Contamination Assessment Plan
CAR	Contamination Assessment Report
CFR	Code of Federal Regulations
CLEAN	Comprehensive Long-Term Environmental Action, Navy
CompQAP	Comprehensive Quality Assurance Plan
CTO	Contract Task Order
FAC	Florida Administrative Code
FDER	Florida Department of Environmental Regulation
FID	flame ionization detector
ft/day	feet per day
ft ² /day	feet squared per day
ft/ft	feet per foot
ft/min	feet per minute
GC	gas chromatograph
HSWA	Hazardous and Solid Waste Amendments of 1984
ID	inside diameter
K	hydraulic conductivity
MOP	Monitoring Only Plan
msl	mean sea level
NADEP	Naval Aviation Depot
NARF	Naval Air Rework Facility
NAS	Naval Air Station
NGVD	National Geodetic Vertical Datum
OVA	organic vapor analyzer
POA	Plan of Action
ppb	parts per billion
ppm	parts per million
PVC	polyvinyl chloride
RCRA	Resource Conservation and Recovery Act
SOUTHNAVFACENGCOM	Southern Division, Naval Facilities Engineering Command
SPT	standard penetration test
SWDA	Solid Waste Disposal Act of 1965
TRPH	total recoverable petroleum hydrocarbons
UIC	uniform identification code
USEPA	U.S. Environmental Protection Agency
UST	underground storage tank
V	average pore water velocity
VOA	volatile organic aromatics
VOC	volatile organic compounds

1.0 INTRODUCTION

In 1987, the Naval Air Rework Facility (NARF) in Pensacola, Florida, was renamed the Naval Aviation Depot (NADEP). NADEP Pensacola, Florida, formerly the operations and repair department of the Naval Air Station (NAS) Pensacola, is now a tenant command located on NAS facilities within the Pensacola Naval Base Complex. The Pensacola Naval Base Complex is located on the western edge of Pensacola Bay on State Route 295 (Navy Boulevard; Figure 1-1). NADEP Pensacola occupies approximately 130 acres at NAS Pensacola. The mission of NADEP Pensacola is to: maintain and operate facilities for, and perform a complete range of, depot-level rework operations on designated weapons systems, accessories, and equipment; manufacture parts and assemblies, as required; provide engineering services in hardware design; furnish technical services on aircraft maintenance and logistic problems; and perform other levels of aircraft maintenance.

During a tank removal program implemented by the U.S. Navy in 1989 and 1990, petroleum underground storage tanks (USTs) at various NADEP site locations were removed. In many cases, these tanks were replaced with new USTs. Tank contents were reportedly restricted to petroleum products ranging from waste oil, diesel fuel, unleaded gasoline, and PD-680 (a petroleum distillate solvent similar to mineral spirits). The reported volumes of the tanks varied from 500 to 3,000 gallons. Soil samples were collected from each tank excavation and analyzed for total recoverable petroleum hydrocarbons (TRPH). Based on TRPH concentrations, 18 sites were found to be non-compliant with Florida Department of Environmental Regulation (FDER) standards, as defined in Chapter 17-770, Florida Administrative Code (FAC).

ABB Environmental Services, Inc. (ABB-ES), was contracted by Southern Division, Naval Facilities Engineering Command (SOUTHNAVFACENGCOM) to perform a contamination assessment (CA) and submit a Contamination Assessment Report (CAR) for each of the 18 petroleum contaminated sites at NADEP. This CAR is submitted for one of the sites, Site 3221NE. The scope of services for the work at Site 3221NE is described in Contract Task Order (CTO) No. 008, the Plan of Action (POA), and the Contamination Assessment Plan (CAP) and included the following:

- drilling of soil borings and analyzing site soils to assess the extent of soil contamination,
- installing and sampling groundwater monitoring wells to assess the extent of groundwater contamination,
- collecting water level data to assess the groundwater flow direction and hydraulic gradient at the site.
- conducting a potable well inventory within a 0.25-mile radius of the site,
- conducting slug tests on selected wells to estimate aquifer characteristics, and

- reducing and analyzing pertinent data gathered during the CA to complete this CAR.

The CA at Site 3221NE was conducted from January through April 1992. The following sections of this report present the background information, data compilation, results, conclusions, and recommendations of the CAR.

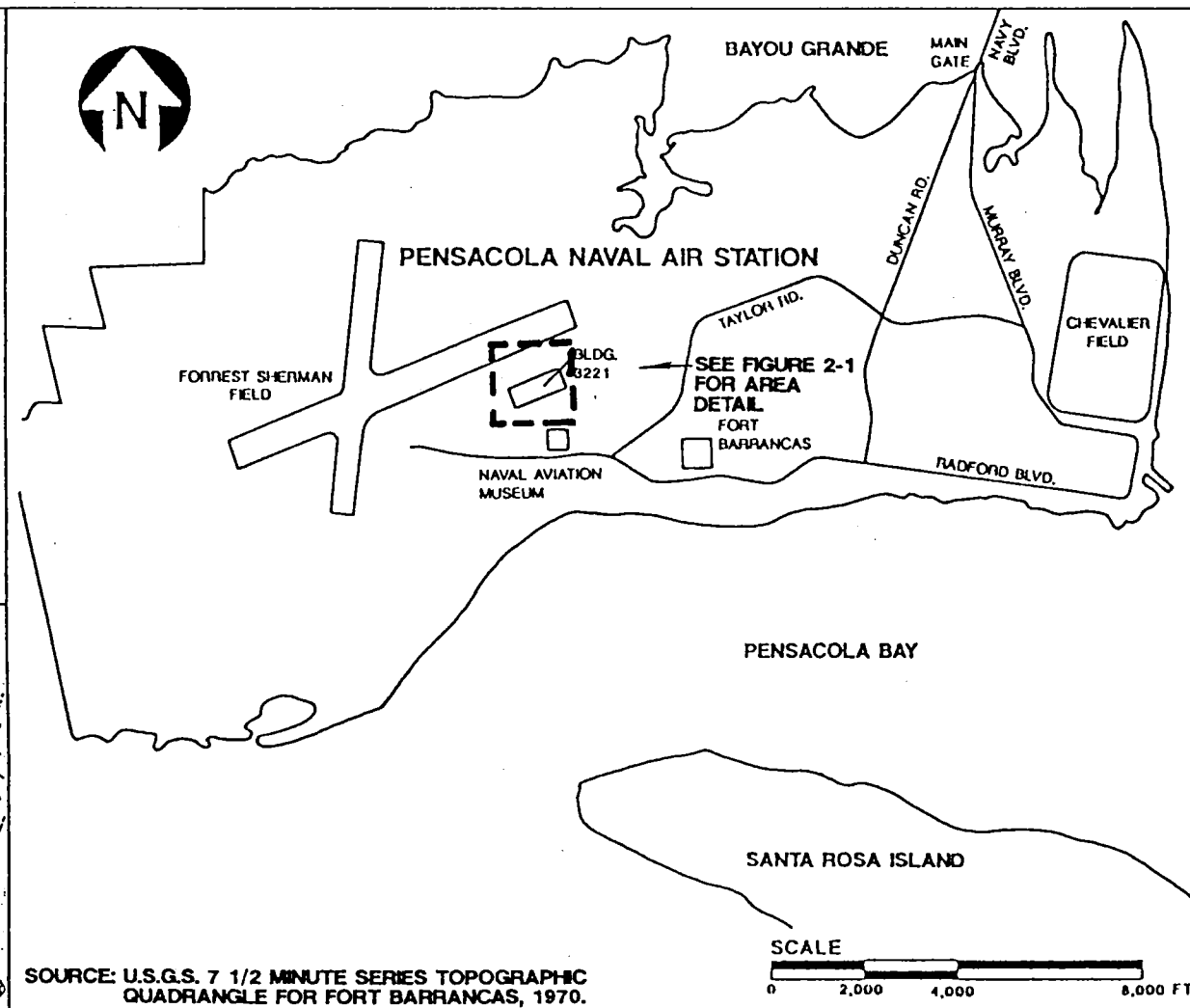
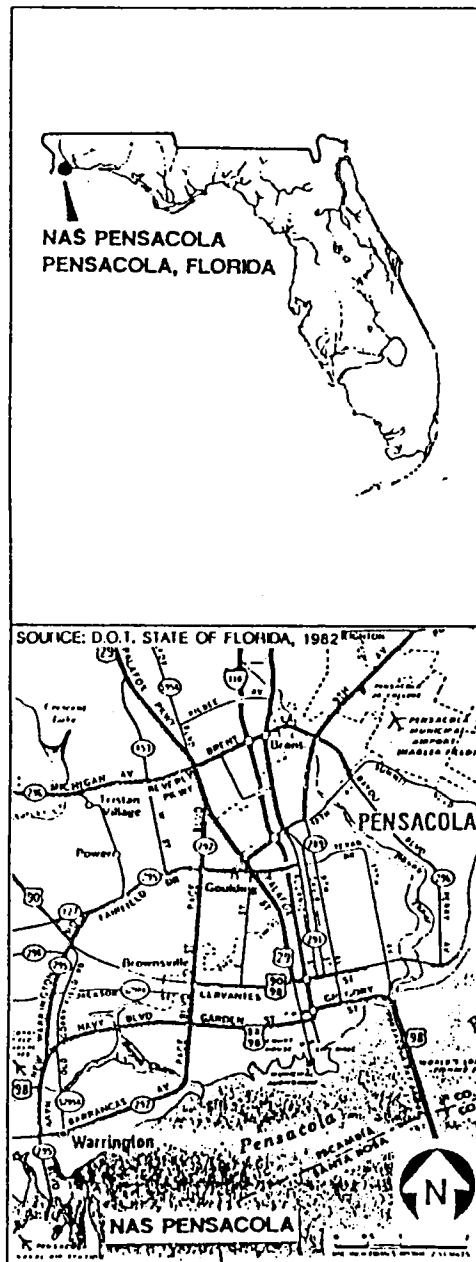


FIGURE 1-1
FACILITY LOCATION MAP



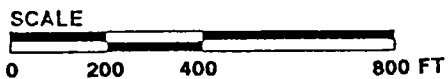
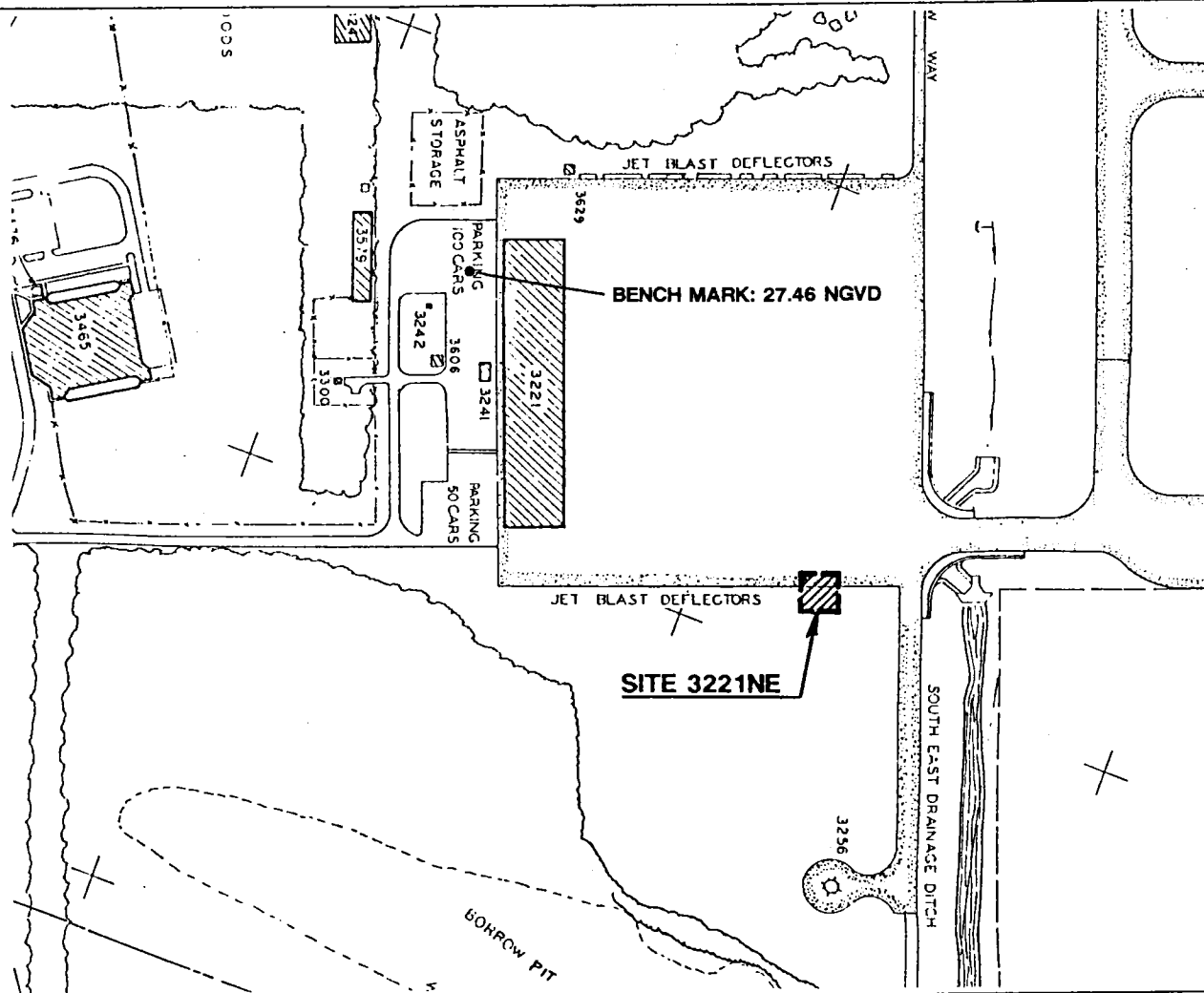
**CONTAMINATION
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SITE 3221NE
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2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION. Site 3221NE is located approximately 400 feet north of the northeast corner of Building 3221, on the eastern perimeter of Forrest Sherman Field (Figure 2-1). Building 3221 is the location of various helicopter maintenance and repair activities for the NADEP. The eastern half of the facility is currently being used by the Museum of Naval Aviation for aircraft restoration. Restoration activities include, but are not limited to, the use of paint and paint products. A large, 18-inch thick concrete apron extends north from Building 3221 to the intersection with the Sherman Field flightline. The concreted area in the immediate site vicinity appears to be primarily used for helicopter and airplane parking. Restoration activities appear to be performed away from the site and in the immediate vicinity of Building 3221.

The site is the former location of a 500-gallon UST reportedly used for the storage of water-contaminated JP-5 fuel and waste oil. Figure 2-2 is a site plan showing the former UST location and surface features in the site vicinity. The UST was located in a grassy area between jet deflectors along the eastern edge of the concrete apron.

2.2 SITE HISTORY. The UST at Site 3221NE was reportedly installed in 1967. During the tank removal and installation program, the UST was removed from the site. A composite soil sample was collected from the former UST excavation and analyzed for TRPH. The reported TRPH concentrations of 1,900 parts per million (ppm) exceeded the FDER regulatory standard of 50 ppm for petroleum contaminated soils (FDER, May 1992) and, therefore, warranted further site investigation pursuant to Chapter 17-770, FAC.



**FIGURE 2-1
SITE LOCATION MAP**



**CONTAMINATION
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PENSACOLA, FLORIDA**

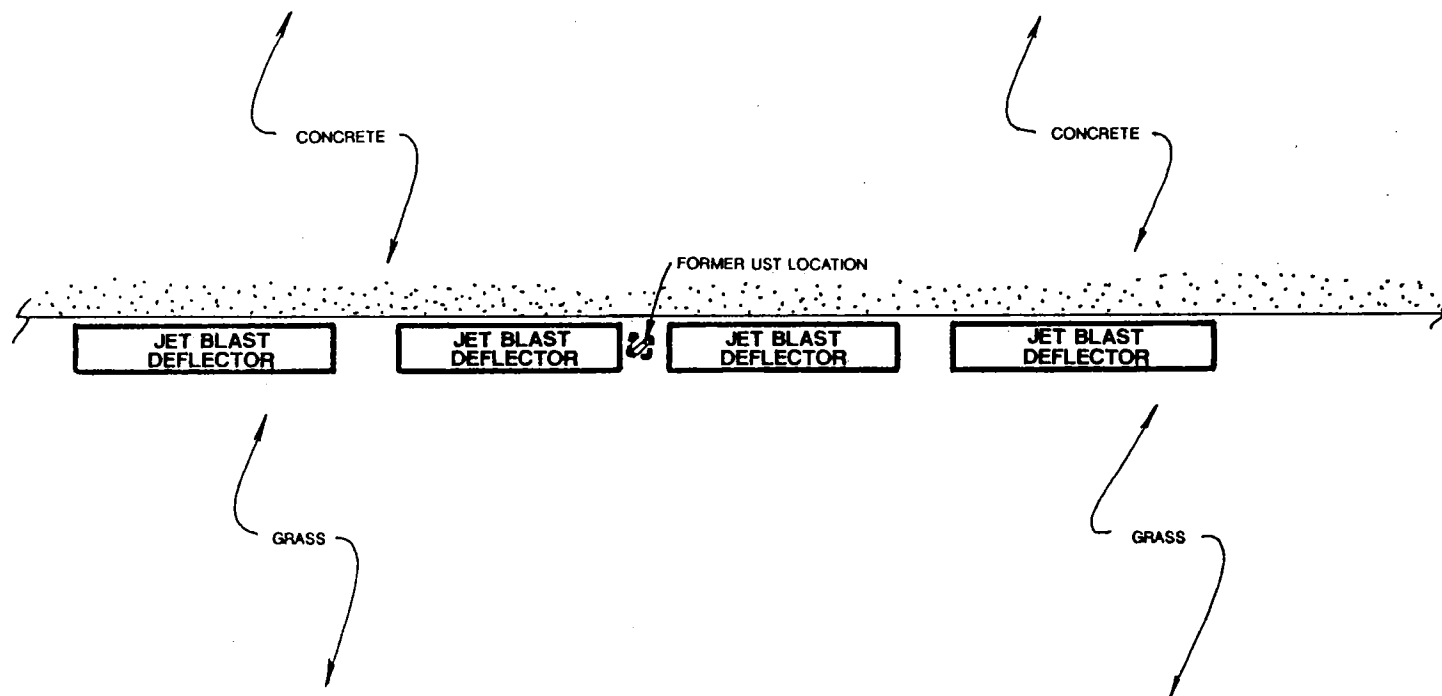


FIGURE 2-2
SITE PLAN



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PENSACOLA, FLORIDA

3.0 SITE CONDITIONS

3.1 PHYSIOGRAPHY. Regional physiography is discussed in Appendix A. Surface elevations at the site are relatively flat and are approximately 20 to 24 feet above mean sea level (msl).

3.2 HYDROGEOLOGY.

3.2.1 Regional and Local The Pensacola area is underlain by three water-bearing zones. These zones, in order of increasing depth, are the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer. A detailed discussion of these three aquifers is presented in Appendix A.

3.2.2 Site Specific The principal aquifer of concern at the site is the surficial zone of the sand-and-gravel aquifer. The surficial zone was penetrated to a depth of 37 feet below land surface (bls) during this investigation. The surficial zone is unconfined, and the water table was encountered at a depth of approximately 6 to 10 feet bls during this assessment. Site-specific aquifer characteristics and other hydrogeologic parameters are discussed in Section 5.1.

Surficial and subsurface soils are generally composed of very fine-grained to medium-grained quartz sand. The sand is variable in color. White to light gray to light brown sand appears to be the most common in the site area. Occasionally, thin peat layers were encountered. The peat layers appear to vary from less than 1 foot to greater than 5 feet in thickness, and were encountered at depths varying from 5 to 17 feet bls. The peat layers are discontinuous and appear to result in the existence of perched water tables in some parts of the site. Complete lithologic logs for all site soil borings and monitoring wells are presented in Appendix B.

4.0 METHODOLOGIES AND EQUIPMENT

4.1 SOIL BORING AND SOIL SAMPLING PROGRAM. Sixteen soil borings, SB1 through SB16, were drilled at the site to assess the extent and levels of soil petroleum contamination, to identify the type of subsurface material, and to aid in the subsequent placement of groundwater monitoring wells. Soil boring locations are shown in Figure 4-1. Composite soil samples collected from split-spoon standard penetration tests (SPTs) were analyzed for petroleum constituents with an organic vapor analyzer (OVA) equipped with a flame ionization detector (FID). Additional soil samples were collected at the locations of selected site monitoring wells. These samples were sent to Wadsworth/Alert Laboratories in Tampa, Florida, for total metals analyses. The results of the soil boring program and soil sampling program are discussed in Section 5.2.

4.2 MONITORING WELL INSTALLATION PROGRAM. Eleven 2-inch inside diameter (ID), shallow, permanent monitoring wells (PEN-3221NE-MW1 through PEN-3221NE-MW11; designated as MW1 through MW11 on figures and tables in this report) were installed in 11 soil borings at the site. In addition, 2-inch ID temporary, shallow piezometers (PEN-3221NE-PZ1 through PEN-3221NE-PZ3; designated as PZ1 through PZ3 on figures and tables) were installed in three of the soil borings at the site. The shallow wells and piezometers were screened in the upper part of the surficial zone, at depths of 5 to 15 feet bls. A deep permanent monitoring well (PEN-3221NE-MW12D; designated as MW12D on figures and tables) was installed in soil boring SB16, which is located downgradient of the former UST location. The deep well was screened at a depth of 30 to 35 feet bls to assess the vertical extent of contamination near the former UST location. No well was installed in soil boring SB8. Monitoring well locations are shown in Figure 4-1. Monitoring well construction methodologies and materials are discussed in Appendix C.

4.3 GROUNDWATER ELEVATION SURVEY. The elevation and slope of the water table were determined by surveying the top of the well casing for each monitoring well to a common reference datum using a surveyor's level and stadia rod. Elevations were referenced to a benchmark located on a culvert near the southwest corner of Building 3221 (see Figure 2-1). This benchmark is part of the U.S. Coastal and Geodetic Survey benchmarking system and has an elevation of 27.46 feet above the National Geodetic Vertical Datum (NGVD) of 1929.

Groundwater level measurements were collected on February 27 and March 30, 1992. Procedures for groundwater level measurements are described in Appendix C.

4.4 GROUNDWATER SAMPLING PROGRAM. Groundwater samples were collected from permanent monitoring wells at the site on February 27, 1992. Duplicate samples were collected from wells PEN-3221NE-MW4 and PEN-3221NE-MW8. Monitoring wells PEN-3221NE-MW6, and PEN-3221NE-MW9 through PEN-3221NE-MW11, were resampled on April 15, 1992. The samples were sent to Wadsworth/Alert Laboratories in Tampa, Florida, for analysis. A laboratory blank, equipment blank, and trip blank were also collected and analyzed. Procedures for collection of groundwater samples are presented in Appendix C.

4.5 AQUIFER SLUG TESTS. Three rising head slug tests were performed in each of the monitoring wells PEN-3221NE-MW6, PEN-3221NE-MW9, PEN-3221NE-MW10, and PEN-3221NE-MW12D to assess the hydraulic conductivity of the surficial zone of the sand-and-gravel aquifer. Procedures for conducting slug tests are included in Appendix C. Slug test data graphs and calculations are attached in Appendix D.

Water table elevations were significantly higher in monitoring wells PEN-3221NE-MW1, PEN-3221NE-MW2, and PEN-3221NE-MW5 than in the remaining site wells. For example, water table elevation measurements obtained on February 27, 1992, indicate that water table elevations in these three wells vary from 15.18 to 16.14 feet above msl (Table 5-1). The other nine wells at the site have water table elevations ranging from 13.93 to 14.25 feet above msl.

Large differences in water table elevations over small horizontal distances were observed in the vicinity of the former UST location. For example, a difference of 1.65 feet in the water table elevation was observed between monitoring wells PEN-3221NE-MW1 and PEN-3221NE-MW9 over a horizontal distance of approximately 15 to 20 feet. These differences in water table elevations indicate the presence of extremely high hydraulic gradients in very localized areas. These gradients suggest the presence of perched water tables. The presence of peat layers in each of the three "abnormal" wells indicates that perched water may be a plausible explanation for high water table elevations observed in these wells.

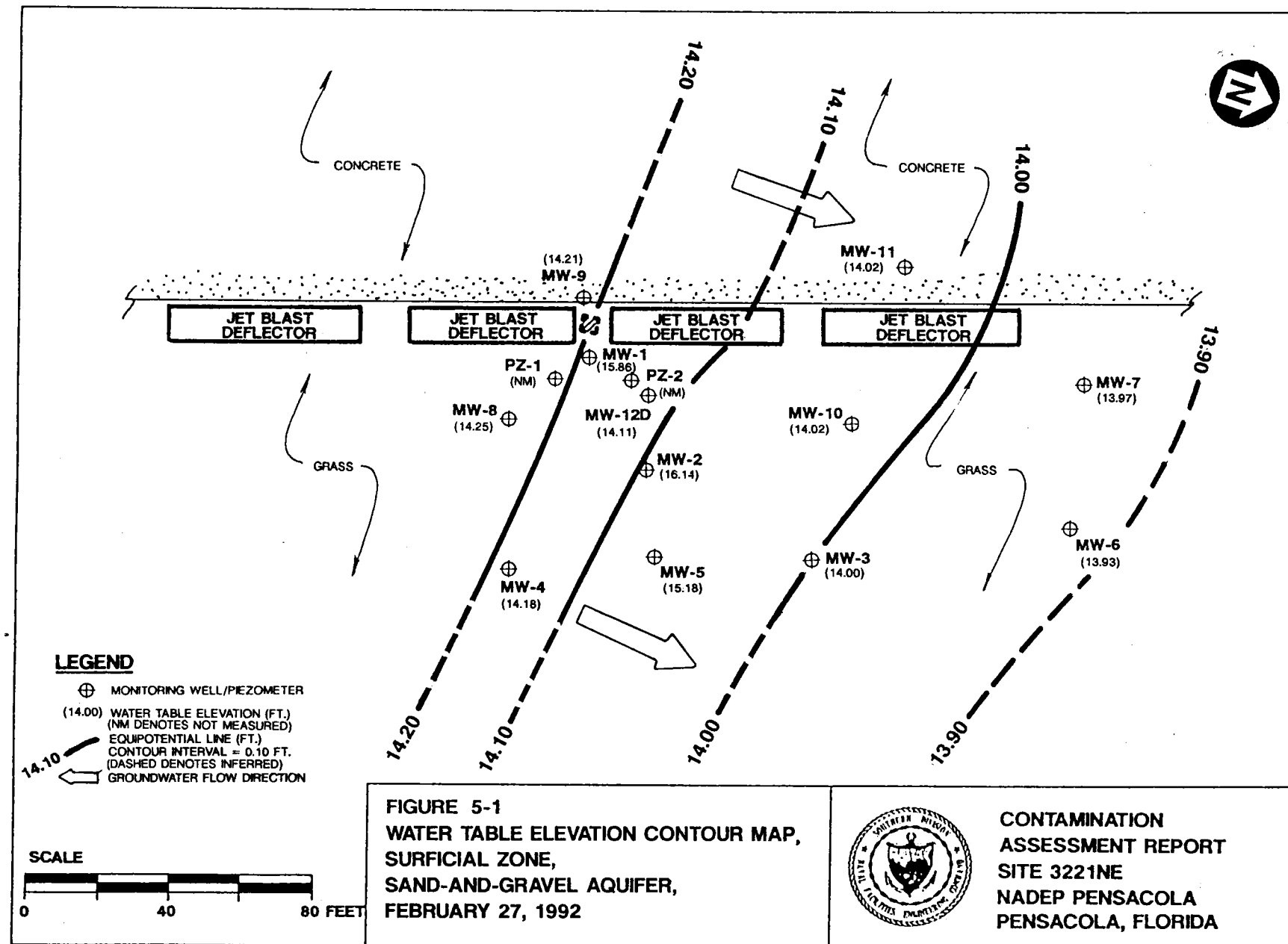
Water table elevation contour maps for the February 27 and March 30, 1992, measurements are shown in Figures 5-1 and 5-2, respectively. Both maps indicate a northerly flow direction in the surficial zone. Water table elevations from the three "perched water" wells are indicated on each figure, but are not used in water table elevation contouring, nor have water table elevations from these wells been used to estimate additional aquifer parameters.

The average hydraulic gradient across the site is 2.5×10^{-3} feet per foot (ft/ft). Slug test results indicate that the average horizontal hydraulic conductivity (K) is 3.3×10^1 feet per day (ft/day). The calculated pore water velocity (V) is 3.3×10^{-1} ft/day. Equations and calculations used to estimate these values are presented in Appendix D.

5.2 CONTAMINANT PLUME DEFINITION AND CHARACTERIZATION.

5.2.1 Soil Contamination Composite soil samples were collected from SPT samples from January 8 to February 7, 1992, at depths of 5 to 7 feet bls, and were analyzed using OVA headspace techniques. On March 30, 1992, additional soil samples were collected adjacent to selected site monitoring wells, at depths of 4 to 7 feet bls, and were submitted to Wadsworth/Alert Laboratories in Tampa, Florida, for total metals analysis. Summaries of the OVA and total metals analyses are presented in Tables 5-2 and 5-3, respectively. Soil contamination distribution at the site is depicted in Figure 5-3.

No petroleum odors or discoloration were noted in the SPT soil samples. No volatile organic compounds (VOC) were detected in samples from soil borings SB1/MW1 through SB6/PZ3, SB8, and SB11/MW6. A minimal amount of VOC (less than 10 ppm) was detected in samples from SB7/MW3, SB9/MW5, SB12/MW7, and SB13/MW8. These concentrations are well below the organic petroleum standard concentration of 10 ppm for "clean" soil (FDER, May 1992). The highest recorded OVA reading was 25 ppm and was measured in the sample collected at SB10/MW4. Sample location SB10/MW4 is located approximately 35 feet north of the former UST location. The water table elevation in SB10/MW4 is approximately equal to that observed at the former UST area (Figures 5-1 and 5-2). The source of the VOC contamination in



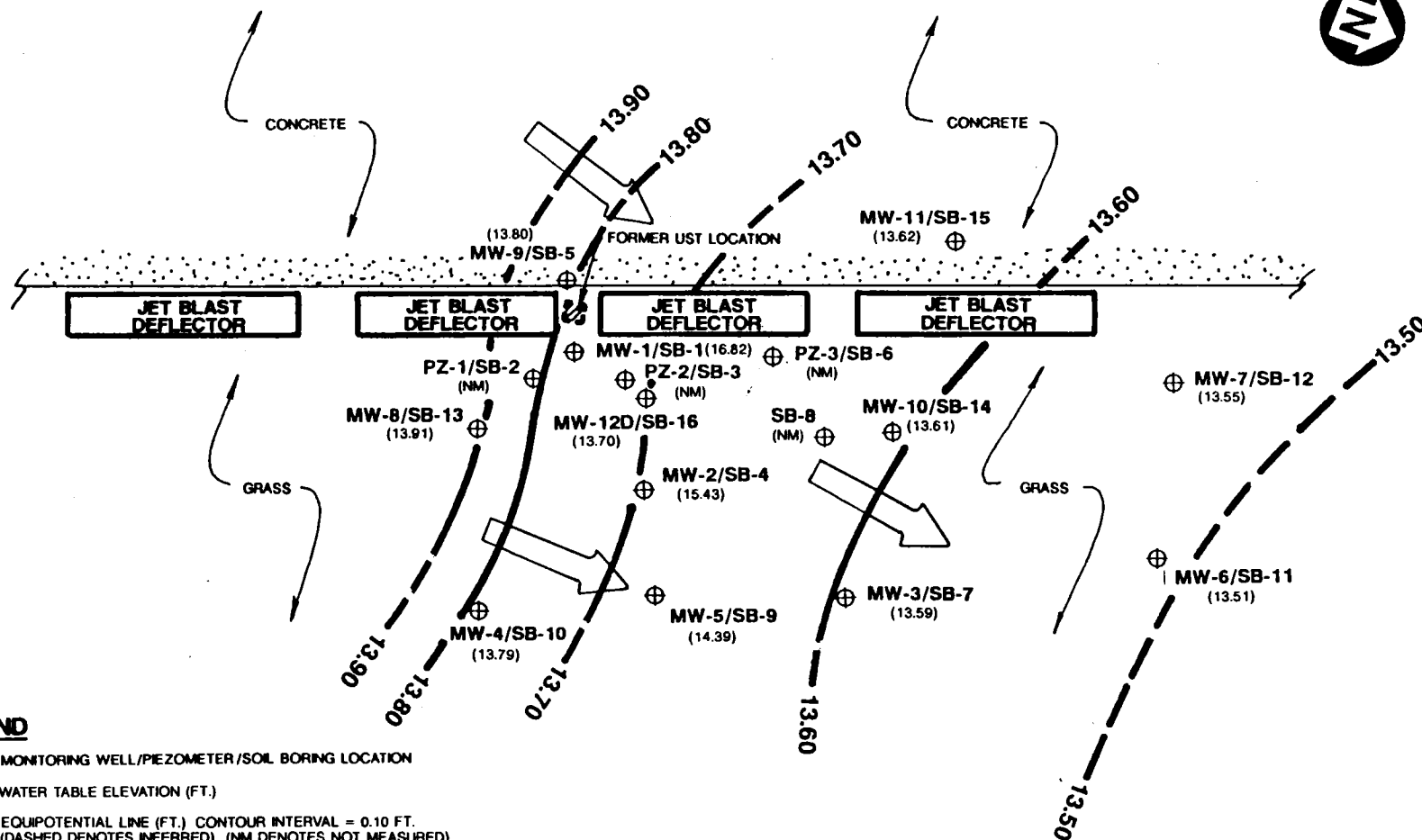


FIGURE 5-2
WATER TABLE ELEVATION CONTOUR MAP
SURFICIAL ZONE,
SAND-AND-GRAVEL AQUIFER,
MARCH 30, 1992



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NE
NADEP PENSACOLA
PENSACOLA, FLORIDA

Table 5-2
Summary of Soil Sample Organic Vapor Analyzer (OVA) Headspace Analyses,
January 8 through February 7, 1992

Contamination Assessment Report
Site 3221NE, Naval Aviation Depot
Pensacola, Florida

Boring Designation	Depth (feet)	Concentration ¹ (ppm)	Comments
MW1/SB1	5 to 7	0	No odor and no discoloration
PZ1/SB2	5 to 7	0	No odor and no discoloration
PZ2/SB3	5 to 7	0	No odor and no discoloration
MW2/SB4	5 to 7	0	Faint petroleum odor
MW9/SB5	5 to 7	0	No odor and no discoloration
PZ3/SB6	5 to 7	0	No odor and no discoloration
MW3/SB7	5 to 7	2	No odor and no discoloration
SB8	5 to 7	0	No odor and no discoloration
MW5/SB9	5 to 7	6	No odor and no discoloration
MW4/SB10	5 to 7	25	No odor and no discoloration
MW6/SB11	5 to 7	0	No odor and no discoloration
MW7/SB12	5 to 7	4	No odor and no discoloration
MW8/SB13	5 to 7	3	No odor and no discoloration
MW10/SB14	5 to 7	NM	No odor and no discoloration
MW11/SB15	5 to 7	NM	No odor and no discoloration
MW12D/SB16	5 to 7	NM	No odor and no discoloration

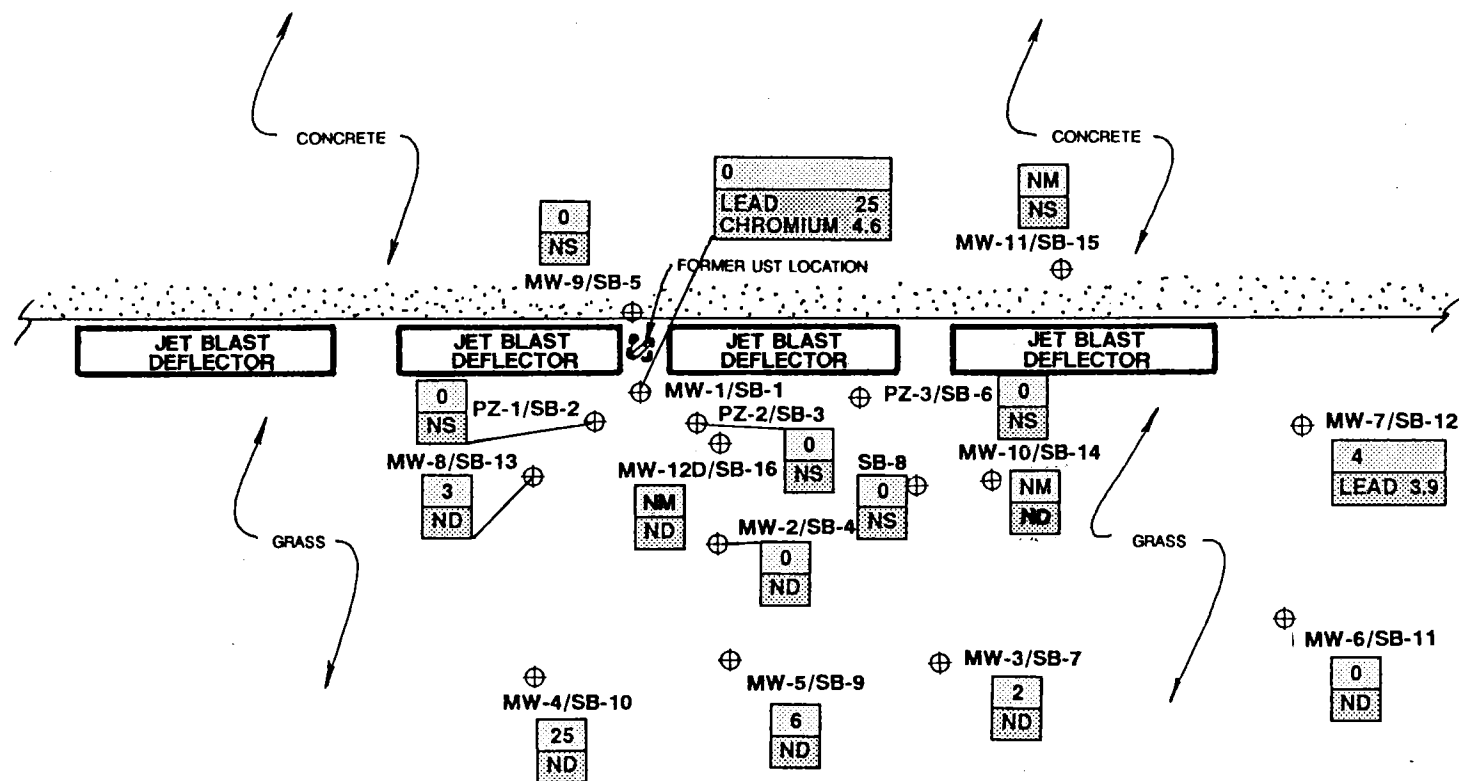
¹Corrected for methane

Notes: ppm = parts per million.
NM = not measured.

Table 5-3
Summary of Soil Sample Laboratory Analyses,
March 30, 1992

Contamination Assessment Report
Site 3221NE, Naval Aviation Depot
Pensacola, Florida

Sample ID	Depth (feet)	Total Metals Analysis Concentration			
		Arsenic	Cadmium	Chromium	Lead
MW1/SB1	5	ND	ND	ND	16
MW1/SB1 duplicate	5	ND	ND	4.6	25
MW2/SB4	5.5	ND	ND	ND	ND
MW3/SB7	5.5	ND	ND	ND	ND
MW4/SB10	5	ND	ND	ND	ND
MW5/SB9	6	ND	ND	ND	ND
MW6/SB11	6	ND	ND	ND	ND
MW7/SB12	4	ND	ND	ND	3.9
MW8/SB13	5	ND	ND	ND	ND
MW9/SB5	NS	NS	NS	NS	NS
MW10/SB14	6	ND	ND	ND	ND
MW11/SB15	NS	NS	NS	NS	NS
MW12D/SB16	7	ND	ND	ND	ND
State regulatory level		55	55	275	77
Notes: Concentrations are in parts per million. ND = not detected. NS = not sampled.					



LEGEND

⊕ MONITORING WELL/PIEZOMETER/SOIL BORING LOCATION

□ OVA READING (ppm)

■ METALS (ppm)

(ND DENOTES NOT DETECTED)
(NM DENOTES NOT MEASURED)
(NS DENOTES NOT SAMPLED)

SCALE

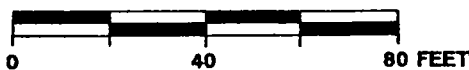


FIGURE 5-3
SOIL CONTAMINATION
DISTRIBUTION MAP
JANUARY 8 THROUGH MARCH 30, 1992



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NE
NADEP PENSACOLA
PENSACOLA, FLORIDA

this area is not known, but does not appear to be from a discharge from the former UST. Furthermore, VOC contamination in the vicinity of SB10/MW4 does not appear to be laterally extensive.

Total metals soil laboratory analyses are presented in Appendix E. These analyses indicate the presence of chromium and lead in samples collected from boring locations SB1/MW1 and SB12/MW7. Lead was detected in the sample and duplicate sample collected at the former UST location, SB1/MW1, at concentrations of 16 ppm and 25 ppm, respectively. Lead was also detected in the sample collected at SB12/MW7 at a concentration of 3.9 ppm. Chromium was detected at SB1/MW1 at a concentration of 4.6 ppm. The observed concentrations of chromium and lead in site soils are well below the State regulatory standards of 275 ppm and 77 ppm, respectively.

Because: (1) *de minimus* concentrations of petroleum contaminants were identified in soils at the site, and (2) total metals concentrations are well below State regulatory standards, it does not appear that soil contamination poses an environmental or health risk at the site.

5.2.2 Groundwater Assessment In some areas near NAS Pensacola, the surficial zone of the sand-and-gravel aquifer has been demonstrated to be hydraulically connected with the main producing zone of the sand-and-gravel aquifer, making potable water supplies susceptible to contamination in these areas (Roaza and others, 1991). For this reason, the surficial zone at NAS Pensacola will be herein treated as a Class G-II groundwater source, and Class G-II groundwater State regulatory standards will be applied throughout this report.

Groundwater samples were collected from site monitoring wells on February 27, 1992. Samples were submitted to Wadsworth/Alert Laboratories in Tampa, Florida, for VOC analysis by U.S. Environmental Protection Agency (USEPA) Method 624, base-neutral and acid-extractable analysis by USEPA Method 625, total metals analysis, and TRPH analysis. These analyses were performed for constituents of the waste oil group as outlined in Chapter 17-770, FAC. Groundwater analytical data are attached in Appendix E. Duplicate samples were collected from wells PEN-3221NE-MW4 and PEN-3221NE-MW8. These are designated as Duplicate 1 and Duplicate 2, respectively.

Monitoring well PEN-3221NE-MW10 was resampled on April 15, 1992, to verify the compounds and concentrations of contaminants detected in the February 27, 1992, sample. Monitoring wells PEN-3221NE-MW6, PEN-3221NE-MW9, and PEN-3221NE-MW11 were also resampled on April 15, 1992, for USEPA Method 624 analysis because the 14-day holding time for the February 27, 1992, samples was exceeded. For these wells, the USEPA Method 624 analyses from the April 15, 1992, sampling event are included in Appendix E.

Petroleum constituents identified include ethylbenzene, toluene, xylenes, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and TRPH. Non-petroleum contaminants identified in groundwater samples are methylene chloride, acetone, 1,2-dichloroethene, and trichloroethene. A total of 39 tentatively identified compounds and six unidentified compounds were also detected in groundwater samples.

Groundwater contaminants identified and their concentrations are summarized in Table 5-4. Tentatively identified compounds and their estimated concentrations are summarized in Table 5-5. Figure 5-4 is a groundwater contamination distribution map showing the areal extent of contamination at the site. Piezometers PZ1 through PZ3 are not shown on Figure 5-4 because they were not sampled. Soil boring SB8 is also not shown because it was abandoned. Analyses for both sampling events for well PEN-3221NE-MW10 are also shown.

Methylene chloride exceeded State regulatory standards in samples collected from six monitoring wells. Trichloroethene and total VOA (the sum of benzene, ethylbenzene, toluene, and xylenes) were detected only in the samples collected from monitoring well PEN-3221NE-MW10. The reported concentrations of these contaminants exceeded State regulatory standards. No other groundwater contaminants identified at the site exceeded State regulatory standards.

Methylene chloride concentrations in the six samples exceeding State regulatory levels varied from 7 parts per billion (ppb) to 39 ppb. Methylene chloride is a common laboratory contaminant. Its presence in the February 27, 1992, equipment blank, and the large discrepancy in concentrations between samples MW-8 and MW-8 duplicate suggest that its presence in the groundwater samples is the result of laboratory contamination. Because: (1) the methylene chloride contamination at the site can be attributed to laboratory contamination, and (2) methylene chloride was not detected in downgradient wells, PEN-3221NE-MW6, PEN-3221NE-MW7, and PEN-3221NE-MW11, it does not appear that methylene chloride is a contaminant of concern.

Acetone was detected in only the samples collected from wells PEN-3221NE-MW1 and PEN-3221NE-MW8. The reported concentrations of 79 ppb and 53 ppb, respectively, are well below the State regulatory guidance concentration of 700 ppb (FDER, February 1989). Furthermore, acetone is a common laboratory contaminant. Its presence in these two groundwater samples does not appear to be significant.

The compound 1,2-dichloroethene was detected in the samples collected from monitoring wells PEN-3221NE-MW6 and PEN-3221NE-MW10. Each sample contained a reported concentration of 3 ppb, which is below the State guidance concentration of 4.2 ppb (FDER, February 1989). Because: (1) concentrations did not exceed State guidance concentrations and (2) this compound was not detected in downgradient wells, it does not appear to be a contaminant of concern at the site.

TRPH were detected in the sample collected from well PEN-3221NE-MW2 and the duplicate sample collected from well PEN-3221NE-MW8. The reported concentrations of 1 ppm and 4 ppm, respectively are below the State regulatory standard of 5 ppm. Because TRPH were not detected in samples collected from other site wells and, thus, appear to have a limited areal extent, TRPH do not appear to be of concern at the site.

Table 5-4
Summary of Groundwater Sample Laboratory Analyses,
February 27 and April 15, 1992

Contamination Assessment Report
Site 3221NE, Naval Aviation Depot
Pensacola, Florida

Compound	State Regulatory/ Guidance Concentration	MW1	MW2	MW3	MW4	MW4 Dupli- cate	MW5	MW6 ¹	MW7	MW8
Methylene chloride	5	ND	8	7	7	39	8	ND	ND	ND
1,2-Dichloroethene (total)	4.2	ND	ND	ND	ND	ND	ND	3	ND	ND
Trichloroethene	3	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene (total)		ND	ND	ND	ND	ND	ND	ND	ND	ND
Total VOA	50	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	³ 700	79	ND	ND	ND	ND	ND	ND	ND	53
Naphthalene		ND	ND	ND	ND	ND	ND	ND	ND	ND
1-Methylnaphthalene		ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Methylnaphthalene		ND	ND	ND	ND	ND	ND	ND	ND	ND
Total naphthalenes	100	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRPH	5	ND	4	ND	ND	ND	ND	ND	ND	ND

See notes at end of table.

Table 5-4 (Continued)
Summary of Groundwater Sample Laboratory Analyses,
February 27 and April 15, 1992 Sampling Events

Contamination Assessment Report
Site 3221NE, Naval Aviation Depot
Pensacola, Florida

Compound	State Regulatory/ Guidance Concentra- tion	MW8 Dupli- cate	MW9 ¹	MW10	MW10 ²	MW11 ¹	MW12D	Equip- ment Blank	Trip Blank	Lab Blank
Methylene chloride	5	25	ND	ND	ND	ND	28	ND	ND	3
1,2-Dichloroethene (total)	4.2	ND	ND	3	ND	ND	ND	ND	ND	ND
Trichloroethene	3	ND	ND	5	ND	ND	ND	ND	ND	ND
Ethylbenzene		ND	ND	40	44	ND	ND	ND	ND	ND
Toluene		ND	ND	1	ND	ND	ND	ND	ND	ND
Xylene (total)		ND	ND	30	92	ND	ND	ND	ND	ND
Total VOA	50	ND	ND	71	136	ND	ND	ND	ND	ND
Acetone	³ 700	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene		ND	ND	13	16	ND	ND	ND	ND	ND
1-Methylnaphtha- lene		ND	ND	7	7	ND	ND	ND	ND	ND
2-Methylnaph- thalene		ND	ND	6	6	ND	ND	ND	ND	ND
Total naphthalenes	100	ND	ND	26	29	ND	ND	ND	ND	ND
TRPH	5	1	ND	ND	ND	ND	ND	ND	ND	ND

¹Resampled on 4/15/92 for U.S. Environmental Protection Agency Method 624 parameters.

²Resampled on 4/15/92 for all parameters.

³Guidance Concentration (Florida Department of Environmental Regulation [FDER], February, 1989).

Notes: All concentrations are in parts per billion, except total recoverable petroleum hydrocarbons (TRPH), which is in parts per million.

ND = not detected.

total VOA = total volatile organic aromatics; the sum of benzene, ethylbenzene, toluene, and xylenes.

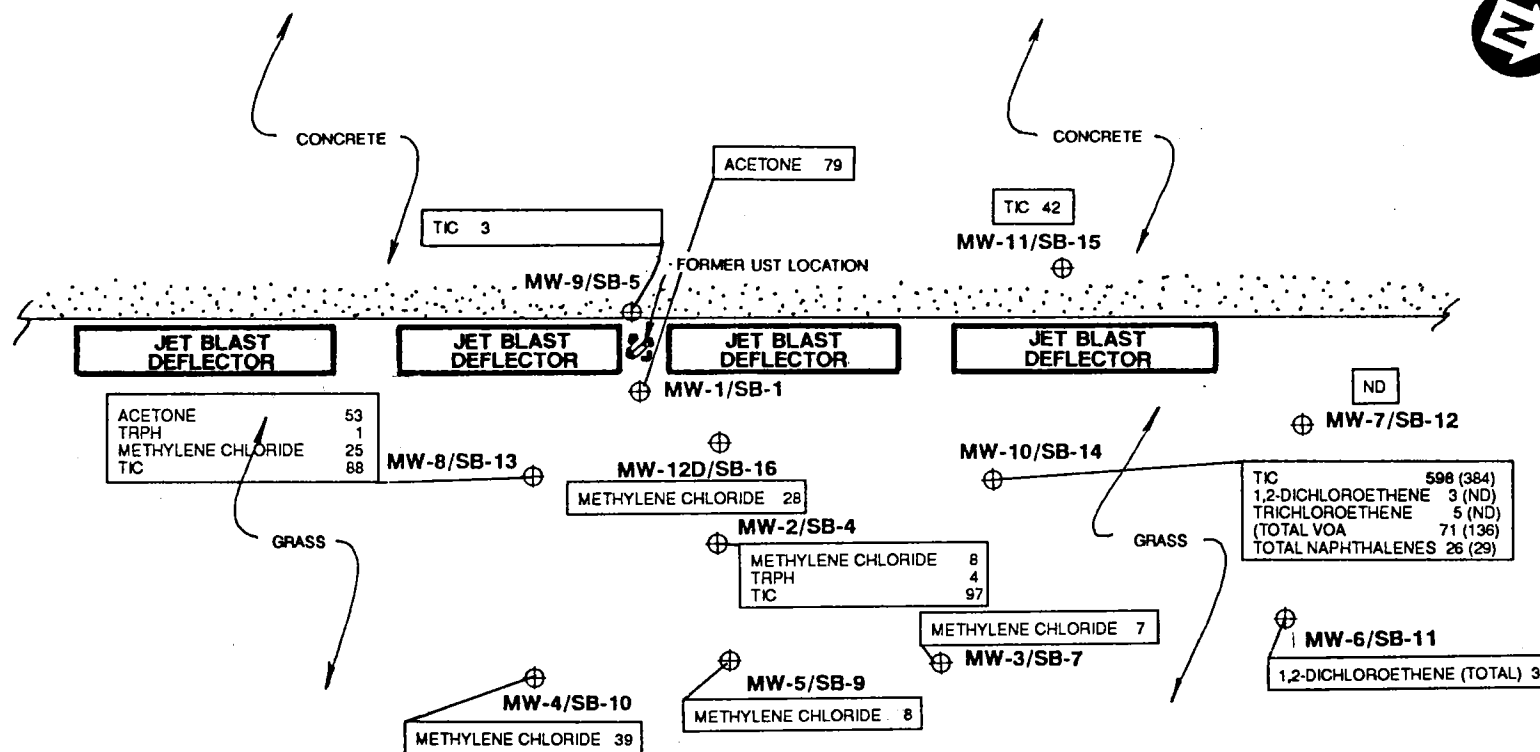
TRPH = total recoverable petroleum hydrocarbons.

Total naphthalenes = the sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene.

Table 5-5
Tentatively Identified Compounds and Their Estimated Concentrations,
February 27 and April 15, 1992

Contamination Assessment Report
Site 3221NE, Naval Aviation Depot
Pensacola, Florida

	MW2	MW8	MW8 Duplicate	MW9	MW10	MW10 ¹	MW11
1,2-Dichloro-1,1,2-trifluoroethane	ND	ND	ND	3	ND	ND	23
1,2-Dimethyl-benzene	ND	ND	ND	ND	ND	57	ND
1,3-Dimethyl-benzene	ND	ND	ND	ND	200	ND	ND
Propyl benzene	ND	ND	ND	ND	10	11	ND
1-Ethyl-2-methyl-benzene	ND	ND	ND	ND	60	44	ND
1-Ethyl-3-methyl-benzene	ND	ND	ND	ND	18	89	ND
1-Ethyl-4-methyl-benzene	ND	ND	ND	ND	42	32	ND
1-Ethyl-3,5-dimethyl-benzene	ND	ND	ND	ND	6	ND	ND
1-Ethyl-2,4-dimethyl-benzene	ND	ND	ND	ND	8	ND	ND
4-Ethyl-1,2-dimethyl-benzene	ND	ND	ND	ND	ND	12	ND
1,2,3-Trimethyl-benzene	ND	ND	ND	ND	110	29	ND
1,2,4-Trimethyl-benzene	ND	ND	ND	ND	39	21	ND
1,3,5-Trimethyl-benzene	ND	ND	ND	ND	19	29	ND
1,2,4,5-Tetramethyl-benzene	ND	ND	ND	ND	10	ND	ND
(1-Methylethyl)-benzene	ND	ND	ND	ND	36	11	ND
Methyl(1-methylethyl)-benzene	8	ND	ND	ND	ND	ND	ND
2,4-Dimethylphenyl	9	ND	ND	ND	ND	ND	ND
1,4-Dimethyl-2(1-methylethyl)benzene	5	ND	ND	ND	ND	ND	ND
Unknown substituted benzene	9	ND	ND	ND	ND	12	ND
1,2,4,5-Tetramethyl-benzene	4	ND	ND	ND	ND	ND	ND
Unknown substituted benzene	12	ND	ND	ND	ND	ND	ND
1-Methyl-3-propyl benzene	ND	ND	ND	ND	12	ND	ND
1-Methyl-2-(1-methylethyl)-benzene	5	ND	ND	ND	13	9	ND
1-Methyl-3-(1-methylethyl)-benzene	ND	ND	ND	ND	15	15	ND
1-Methyl-4-(1-methylethyl)-benzene	10	ND	ND	ND	ND	ND	ND
(1) Unknown	8	ND	ND	ND	ND	ND	ND
(3) Unknown	ND	59	ND	ND	ND	ND	ND
1-(1,1-Dimethylethyl)4-methyl-benzene	4	ND	ND	ND	ND	ND	ND
3-Methyl-undecane	ND	ND	18	ND	ND	ND	ND
5-Methyl-undecane	ND	ND	11	ND	ND	ND	ND
2,6-Dimethyl-undecane	8	ND	ND	ND	ND	ND	ND
2,3,6-Trimethyl-octane	10	ND	ND	ND	ND	ND	ND
9-Octyl-heptadecane	5	ND	ND	ND	ND	ND	ND
4-Methyl benzoic acid-2-oxo-2-phenylethyl ester	ND	ND	ND	ND	ND	13	ND
2,3,4-Trimethyl pentane	ND	ND	ND	ND	ND	ND	1
3,3-Dimethyl hexane	ND	ND	ND	ND	ND	ND	4
(1,1-Dimethylethyl) benzene	ND	ND	ND	ND	ND	ND	2
1,2-Diethyl benzene	ND	ND	ND	ND	ND	ND	2
2,3-Dihydro-1-methyl-1H-indene	ND	ND	ND	ND	ND	ND	1
2-Butenyl benzene	ND	ND	ND	ND	ND	ND	2
2,3-Dihydro-1,1-dimethyl-1H-indene	ND	ND	ND	ND	ND	ND	4
(1-Methyl-1-propenyl) benzene	ND	ND	ND	ND	ND	ND	2
1,2,3,4-Tetrahydro-1,4-methoronaphthalene-9-ol	ND	ND	ND	ND	ND	ND	1
Total concentration of tentatively identified compounds	97	59	29	3	598	384	42
¹ April 15, 1992, sampling event.				Notes: All results are in parts per billion. ND = not detected.			



LEGEND

- ⊕ MONITORING WELL/PIEZOMETER/SOIL BORING LOCATION
- CONTAMINATION (ppb)
- TRPH Reported in ppm and DENOTES TOTAL RECOVERABLE PETROLEUM HYDROCARBONS
(ND DENOTES NOT DETECTED) (NS DENOTES NOT SAMPLED)
(TIC DENOTES TENTATIVELY IDENTIFIED OR UNIDENTIFIED COMPOUNDS)
FOR MW-10, CONCENTRATIONS No.s in () DENOTES APRIL 15, 1992 SAMPLING.

SCALE

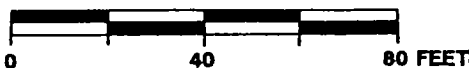


FIGURE 5-4
GROUNDWATER CONTAMINATION
DISTRIBUTION MAP,
FEBRUARY 27 AND APRIL 15, 1992



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NE
NADEP PENSACOLA
PENSACOLA, FLORIDA

The most contaminated well at the site is well PEN-3221NE-MW10. This well is located approximately 80 feet downgradient of the former UST location. As previously mentioned, this well was sampled on two occasions, February 27, 1992, and April 15, 1992. Contaminants detected in the sample collected on February 27, 1992, and not identified in any other site wells, were trichloroethene, ethylbenzene, toluene, xylenes, naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene. Trichloroethene and total VOA (the sum of benzene, ethylbenzene, toluene, and xylenes) concentrations exceeded State regulatory standards in this sample. The concentrations of total naphthalenes (the sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene) were below State regulatory standards in samples collected on both dates.

The reported trichloroethene concentration of 5 ppb for the February 27, 1992, sample slightly exceeds the State regulatory standard of 3 ppb. Trichloroethene was not detected in wells PEN-3221NE-MW6 and PEN-3221NE-MW7, which are located farther downgradient of PEN-3221NE-MW10. Furthermore, trichloroethene was not detected in the sample collected from well PEN-3221NE-MW10 on April 15, 1992, indicating that trichloroethene contamination is of limited areal extent at the site.

The total VOA concentration for the February 27, 1992, sample from PEN-3221NE-MW10 was 71 ppb. The April 15, 1992, sample indicated an increase in total VOA concentration to 136 ppb. No VOA constituents were detected in any other site wells, including downgradient wells PEN-3221NE-MW6 and PEN-3221NE-MW7. Despite the apparent increase in total VOA concentration in the latter sampling event, it appears that these contaminants are of limited areal extent, and do not appear to be migrating off the site.

A total of 39 tentatively identified compounds and six unidentified compounds were detected in groundwater samples collected from monitoring wells PEN-3221NE-MW2, and PEN-3221NE-MW8 through PEN-3221NE-MW11. The tentatively identified compounds generally appear to be fuel constituents or probable fuel degradation products. These compounds and their estimated concentrations are shown in Table 5-5. Regulatory or guidance standards have not yet been established for these compounds.

The highest concentrations of tentatively identified and unidentified compounds were found in the samples collected from well PEN-3221NE-MW10. The February 27, 1992, sample collected from this well contained 15 tentatively identified compounds with a total estimated concentration of 598 ppb. The April 15, 1992, sample showed a decrease to 14 compounds with a total estimated concentration of 384 ppb.

The total concentrations of tentatively identified compounds or unidentified compounds did not exceed 100 ppb in any other site well. Tentatively identified compounds were not detected in the farthest downgradient site wells, PEN-3221NE-MW6 and PEN-3221NE-MW7.

Ten tentatively identified compounds and three unidentified compounds were detected in the sample collected from well PEN-3221NE-MW2. The total estimated concentration of these compounds is 97 ppb. Only one compound, an unidentified substituted benzene, had an estimated concentration in excess of 10 ppb.

Three unidentified compounds were detected in the sample collected from well PEN-3221NE-MW8 with a total estimated concentration of 59 ppb. Two compounds, 3-methylundecane and 5-methylundecane, were tentatively identified in the duplicate sample obtained from this well with an estimated concentration of 18 ppb and 11 ppb, respectively.

Only one tentatively identified compound was detected in the sample obtained from well PEN-3221NE-MW9. The compound 1,2-dichloro-1,1,2-trifluoroethane had an estimated concentration of 3 ppb in this sample.

Ten tentatively identified compounds were detected in the sample collected from well PEN-3221NE-MW11. The total estimated concentrations of these compounds was 42 ppb. The compound 1,2-dichloro-1,1,2-trifluoroethane had an estimated concentration of 23 ppb. The other nine compounds had estimated concentrations of 4 ppb or less.

In summary, analytical data indicate groundwater contamination at the site is not significant. Methylene chloride detections appear to be the result of laboratory contamination. Trichloroethene was detected at concentrations just above State regulatory standards in the February 27, 1992, sample from well PEN-3221NE-MW10; however, this compound was not detected in the April 15, 1992, sample, nor was it detected in any other samples. Methylene chloride was the only contaminant detected in the deep well installed at the site, PEN-3221NE-MW12D, and the contaminant is believed to be a laboratory artifact. This well is located immediately downgradient to the former UST area; thus, it appears that the vertical extent of contamination is less than 30 feet bls.

The only area of concern appears to be in the immediate vicinity of monitoring well PEN-3221NE-MW10, located approximately 80 feet downgradient of the former UST location. The most recent sample collected from this well exceeded the State regulatory standard for total VOA and contained relatively high concentrations of tentatively identified compounds. However, contaminants detected in this well were not detected in the downgradient wells PEN-3221NE-MW6 and PEN-3221NE-MW7; thus, it appears that groundwater contaminants in well PEN-3221NE-MW10 have not migrated from the site, and the areal extent of contamination appears to be relatively small.

5.3 POTABLE WELL SURVEY. A potable well survey was conducted to assess the risk of contamination to potable water sources from activities at Site 3221NE. Two potable supply wells (designated as Well No. 1 and Well No. 2 in Figure 5-5) exist at NAS Pensacola (Wilkins and others, 1985). The NAS Pensacola water supply system is used in conjunction with the Corry Field water supply system, which is located approximately 2 miles north of NAS Pensacola. According to NADEP personnel, these two wells are not currently used for potable water supplies at NAS Pensacola, but are available as reserve potable water supplies should the need arise.

Potable well inventory data are presented in Table 5-6. Both wells at NAS Pensacola are screened in the main producing zone of the sand-and-gravel aquifer at depths ranging from 105 to 160 feet bls. No well is located within a 0.25-mile radius of the site; therefore, the possibility of contamination of potable water sources from activities at Site 3221NE does not appear feasible.

**Table 5-6
Potable Well Inventory Data,
Naval Air Station, Pensacola Florida**

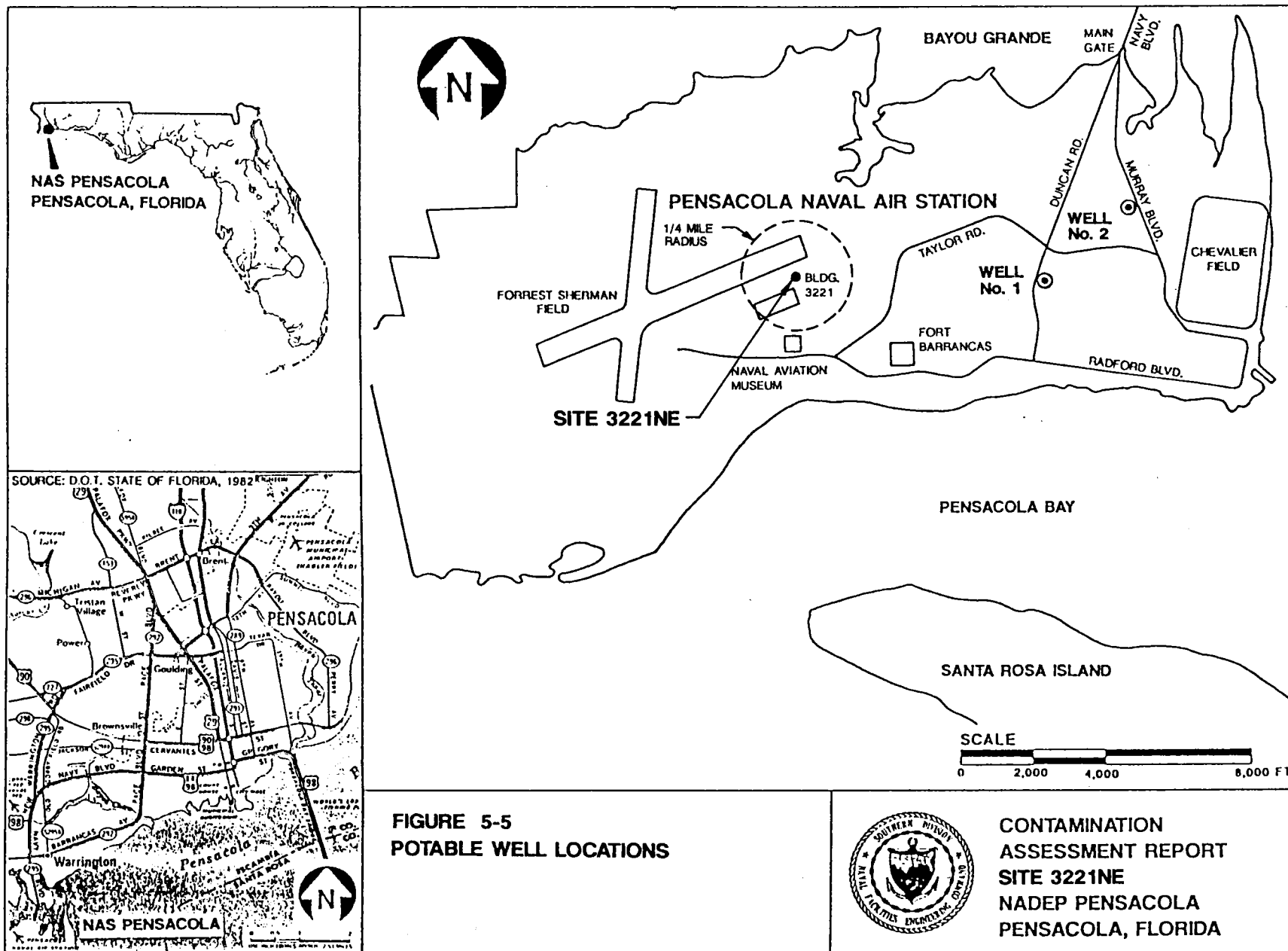
Contamination Assessment Report
Site 3221NE, Naval Aviation Depot
Pensacola, Florida

Well Identification Number/Local Name	Location	Total Depth (feet)	Screened Interval (feet)	Diameter Casing/Screen (inches)
302116087170201/No. 1	Sec. 1,T3S,R30W Duncan and Taylor Roads	174	105-160	24/12
302124087163601/No. 2	Sec. 1,T3S,R30W Murray and Farrar Roads	178	110-160	24/12

Table 5-6
Potable Well Inventory Data,
Naval Air Station, Pensacola Florida

Contamination Assessment Report
 Site 3221NE, Naval Aviation Depot
 Pensacola, Florida

Well Identification Number/Local Name	Location	Total Depth (feet)	Screened Interval (feet)	Diameter Casing/Screen (inches)
302116087170201/No. 1	Sec. 1,T3S,R30W Duncan and Taylor Roads	174	105-160	24/12
302124087163601/No. 2	Sec. 1,T3S,R30W Murray and Farrar Roads	178	110-160	24/12



6.0 SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

6.1 SUMMARY. Based on the results of the field investigations and the laboratory analytical results collected during this investigation, the following is a summary of conditions at the site.

- The sediments encountered during drilling operations are generally comprised of very fine-grained to medium-grained quartz sand. These sediments are part of the surficial zone of the sand-and-gravel aquifer (Roaza and others, 1991).
- Groundwater beneath the site was encountered at depths of approximately 6 to 10 feet bls and is classified as G-II.
- The direction of groundwater flow in the surficial zone is to the north.
- The average hydraulic gradient across the site is 2.5×10^{-3} ft/ft.
- The average hydraulic conductivity at the site is 3.3×10^1 ft/day.
- The average pore water velocity is 3.3×10^{-1} ft/day.
- OVA headspace analyses indicated minimal petroleum contamination in soils at the site. Only one sample exceeded the petroleum standard for "clean" soil, and no excessively petroleum-contaminated soils were identified at the site.
- Chromium and lead were identified in soil samples collected at the site, but concentrations of each were below State regulatory levels for total metals analysis.
- Compounds identified in groundwater samples at the site include methylene chloride, trichloroethene, 1,2-dichloroethene, acetone, ethylbenzene, toluene, xylenes, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, and TRPH. The groundwater contamination does not extend to 30 feet bls in the vicinity of the former UST location.
- Methylene chloride concentrations exceeded State regulatory standards in samples from six monitoring wells; however, the presence of methylene chloride appears to be the result of laboratory contamination.
- Total VOA concentrations exceeded State regulatory standards in samples collected from only one site well, PEN-3221NE-MW10. The extent of petroleum contamination appears to be restricted to the immediate vicinity of this well.
- The 39 tentatively identified compounds and 6 unidentified compounds do not appear to be of major concern outside the immediate area of well PEN-3221NE-MW10.
- The apparent source of contamination, the former UST, has been removed from the site.

- Because no potable water sources were identified within a 0.25-mile radius of the site, there appears to be little risk of contamination of the public water supply system from activities at the site.

6.2 CONCLUSIONS. The level of soil and groundwater contamination identified at Site 3221NE does not appear to be significant and is not anticipated to affect local potable water supplies on the base. The only area of concern appears to be the groundwater in the immediate vicinity of well PEN-3221NE-MW10. Groundwater contaminants do not appear to be migrating from the site, and were detected in concentrations that are not anticipated to present a significant health or environmental concern at the site.

6.3 RECOMMENDATIONS. Based on the findings and interpretations of this contamination assessment, a *Monitoring Only Plan (MOP)* is herewith submitted for Site 3221NE. This plan recommends the quarterly groundwater sampling of all site monitoring wells. Samples would undergo VOC analysis by USEPA Method 624, base-neutral and acid-extractable analysis by USEPA Method 625, and TRPH analysis. Total metals analysis would be excluded from the monitoring program, because no metals were detected in any samples collected from site wells, and the level of soil metals contamination at the site appears to be minimal. Quarterly groundwater monitoring would continue for a period of 1 year, or until contamination decreases to levels that are acceptable to the State regulatory agency.

7.0 PROFESSIONAL REVIEW CERTIFICATION

The contamination assessment contained in this report was prepared using sound hydrogeologic principles and judgment. This assessment is based on the geologic investigation and associated information detailed in the text and appended to this report. If conditions are determined to exist that differ from those described, the undersigned geologist should be notified to evaluate the effects of any additional information on the assessment described in this report. This Contamination Assessment Report was developed for the UST located at Site 3221NE at the Naval Aviation Depot, Naval Air Station, Pensacola, Florida, and should not be construed to apply to any other site.

Roger Durham
Professional Geologist
P.G. No. 001127

Date

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APPENDIX A
SITE CONDITIONS

Regional and Local Physiography

Florida is divided into four physiographic zones; the Coastal Lowlands, the Central Highlands, the Northern Highlands, and the Marianna Lowlands (Puri and Vernon, 1964). The Pensacola area lies entirely within the Coastal Lowlands zone, which closely parallels the Florida coastline. The Coastal Lowlands are further divided into the Atlantic, Distal, and Gulf Coastal Lowlands (Puri and Vernon, 1964). The Naval Aviation Depot (NADEP) Pensacola falls within the Gulf Coastal Lowlands. The lowlands are characterized by poor drainage and elevations less than 100 feet above mean sea level. Landforms include barrier islands, estuaries, coastal ridges, dunes, and valleys (Puri and Vernon, 1964).

Land surface altitudes at NADEP Pensacola range from sea level at the coast to greater than 30 feet above sea level. Surface drainage is variable, but is generally toward the nearest body of water.

Regional Hydrogeology

NADEP Pensacola is underlain by three water bearing zones. These zones include the sand-and-gravel aquifer, the Upper Floridan aquifer, and the Lower Floridan aquifer.

The sand-and-gravel aquifer is comprised of Pleistocene terrace deposits, the Pliocene Citronelle Formation (Marsh, 1966), and Miocene coarse clastics. These deposits extend from the surface to a depth of approximately 400 feet below land surface (bls) and are predominantly poorly sorted, fine-grained to coarse-grained sands interbedded with numerous layers of clay and gravel (up to 60 feet thick). There is great lithologic variability in these deposits. Clay lenses and the presence of hardpan layers within the sand-and-gravel aquifer result in the occurrence of perched water tables and artesian conditions in some areas (Musgrove and others, 1965). Groundwater flow is generally topographically controlled. Recharge to the aquifer is derived almost entirely from local rainfall. The sand-and-gravel aquifer is the sole source of potable groundwater in the Pensacola area (Roaza and others, 1991).

The sand-and-gravel aquifer is divided into three major zones: the surficial zone, the low permeability zone, and the main producing zone (Roaza and others, 1991). These designations are based on changes in permeability of the sediments comprising each zone. The surficial zone is the uppermost layer of the aquifer. It consists primarily of sand and gravel with occasional silt and clay deposits. This zone ranges in thickness from 0 to 150 feet (Roaza and others, 1991). The low permeability zone, which underlies the surficial zone, consists of various mixtures of clay, silt, sand, and gravel. Locally, this zone contains poorly sorted sands, with gravel and some clay (Roaza and others, 1991). The thickness of the zone varies from 50 to 100 feet. Individual beds of the low permeability zone are highly discontinuous, and in some areas there may be hydraulic connection between the surficial zone and the main producing zone. The main producing zone is composed of moderate to well sorted sand-and-gravel beds that are typically interbedded with beds of fine-grained sand and clay. Locally, this zone typically contains medium-grained sands and sandy clays (Roaza and others, 1991). The thickness of the main producing zone ranges from 200 to 300 feet. The Upper Floridan aquifer is comprised of deposits correlative to the lower Miocene Tampa Formation and the upper Oligocene Chickasawhay Formation. These

two formations are undifferentiated in the Pensacola area. Locally these deposits are approximately 380 feet thick (Marsh, 1966) and are typically brown to light gray, hard, fossiliferous dolomitic limestones or dolomites with a distinctive spongy-looking texture. Locally, the overlying Pensacola Clay is approximately 1,000 feet thick and forms an effective confining unit between the sand-and-gravel aquifer and the Upper Floridan aquifer (Marsh, 1966). This confining unit has also been designated as part of the Intermediate System (Roaza and others, 1991). The Upper Floridan aquifer is recharged by local rainfall in Conecuh, Escambia, and Monroe Counties, Alabama (Healy, 1980). General groundwater flow in the Upper Floridan aquifer is to the southeast toward the Gulf of Mexico (Barr, 1987). The groundwater in the Upper Floridan aquifer is mineralized in this area and is not used as a water supply.

The Lower Floridan aquifer is comprised of upper to middle Eocene limestones. The aquifer is approximately 500 feet thick in the vicinity (Marsh, 1966). The limestones are typically white to grayish cream, soft, and chalky. The Lower Floridan aquifer is confined from above by the Bucatunna Clay Member of the middle Oligocene Byram Formation and from below by gray shales and clays of middle Eocene age. The Bucatunna Clay, also called the Intermediate Zone, is approximately 170 feet thick in the vicinity (Musgrove and others, 1965). Groundwater flow in the aquifer is to the southeast toward the Gulf of Mexico (Healy, 1980). The water quality is poor because of high mineralization.

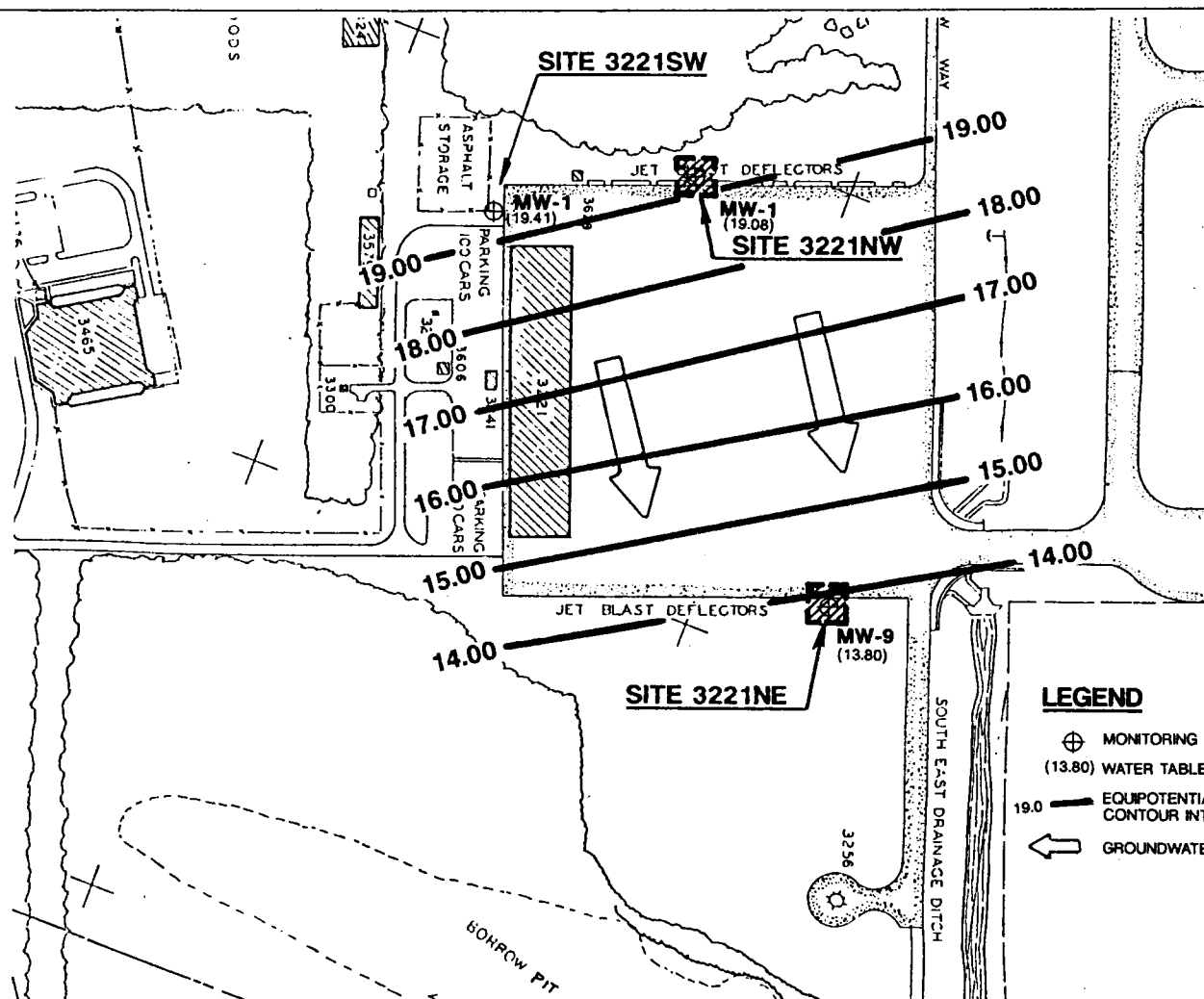
Local Hydrogeology

The surficial zone of the sand-and-gravel aquifer is the interval of primary concern at Naval Air Station (NAS) Pensacola. The surficial zone extends from the surface to a depth of approximately 100 feet bls. Soils from 0 to 50 feet bls are generally composed of fine- to very fine-grained sands, with very little silt and clay. Occasional coarse-grained sands to fine-grained gravels were found with the fine- to very fine-grained sands, and thin peat layers were found at NAS Pensacola in the Sherman Field vicinity.

Groundwater in the surficial zone is non-artesian and is encountered at depths of less than 2 feet bls to greater than 20 feet bls at the NADEP facility. The depth to groundwater is mainly controlled by topography. Recharge is predominantly from local rainfall.

Figure A-1 shows the groundwater flow direction in the site vicinity on March 30, 1992, based on measurements taken from three monitoring wells at Sites 3221NE, 3221NW, and 3221SW. The direction of groundwater flow in the Building 3221 vicinity appears to be to the east; however, in the immediate vicinity of Site 3221NE, the direction of groundwater flow is toward the north. Perched water tables were observed at Site 3221NE and apparently result from the presence of peat layers.

Locally, hydraulic gradients in the surficial zone vary from approximately 1×10^{-3} feet per foot (ft/ft) to 7×10^{-3} ft/ft. Gradients are generally less in the lower flat-lying areas than those in the topographically higher areas. Water level measurements, taken on numerous occasions at low-elevation sites located near Pensacola Bay, indicate that tidal fluctuations do not appear to alter the groundwater flow direction and do not appear to significantly affect the hydraulic gradients observed at NAS Pensacola.



SCALE
0 200 400 800 FT

FIGURE A-1
WATER TABLE ELEVATION CONTOUR MAP,
SURFICIAL ZONE,
SAND-AND-GRAVEL AQUIFER,
MARCH 30, 1992 3221 COMPLEX



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NE
NADEP PENSACOLA
PENSACOLA, FLORIDA

APPENDIX B
LITHOLOGIC LOGS

TITLE: NADEP Pensacola				LOG of WELL: 3221NE MW-1		BORING NO. SBI	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/8/92		COMPLTD: 1/8/92	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'-15'		PROTECTION LEVEL: 0	
TOC ELEV.: 23.88 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.		DPTH TO ∇: 8.88 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0.0			0.0	SAND: Light-brown to orange-red, very fine to fine grained.		SP	POSTHOLE	
5		1.7/2	0.0	SAND: Light brown to tan to brown-red, fine to medium grained, some organics.		SP	2,2,2,3	
10		1.6/2	125.0	SAND: Brown to orange-red, fine to medium grained.		SP	2,2,2,2	
15		2.0/2	-	SAND: Dark brown, fine grained, some organics, mixed with peat-like material and plant roots, wet.		PT	13,18,24,31	
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 3221NE MW-2		BORING NO. SB4	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/9/92		COMPLTD: 1/9/92	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'-15'		PROTECTION LEVEL: D	
TOC ELEV.: 23.28 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.		DPTH TO ∇: 7.86 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/B-IN	WELL DATA
				0.0	SAND: Tan to orange-tan, very fine to fine grained.		SP		
5			1.4/2	0.0	SAND: Light tan to light brown, very fine to fine grained, faint petroleum odor.		SP	2,5,7,8	
10			2.0/2	5.0	SAND: Tan to dark grey, very fine to fine grained, faint diesel odor. SANDY PEAT: Dark brown with dark grey sand, fine grained, organic odor.		PT	1,1,1,1	
15			12/2	17.0	SAND: Brown to light brown, organic odor, wet.		SP	15,27,38,35	
20									
25									

TITLE: NADEP Pensacola				LOG of WELL: 3221NE MW-3		BORING NO. SB7	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/9/92		COMPLTD: 1/9/92	
METHOD: HSA		CASE SIZE: 2 Inch		SCREEN INT.: 5'-15'		PROTECTION LEVEL: D	
TOC ELEV.: 19.89 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.		DPTH TO ∇: 8.30 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/8-IN	WELL DATA
				SAND: Orange-brown to light brown, very fine to fine grained.		SP	POSTHOLE	
5		2.0/2	2.0	SAND: Dark brown to tan-brown, very fine grained, some clay, organics.		SP	2,3,2,2	
10		1.0/2		SAND: Dark brown to off-white, very fine to fine grained, wet.		SP	5,11,17,17	
15		2.0/2	0.0	SAND: Off-white to light brown, very fine to fine grained, wet.		SP	6,15,27,25	
20								
25								

TITLE: NADEP Pensacola		LOG of WELL: 3221NE MW-4		BORING NO. SB10	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL			DATE STARTED: 1/10/92		COMPLTD: 1/10/92
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'-15'	
TOC ELEV.: 21.05 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/10/92			SITE: NADEP Pensacola

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/8-IN	WELL DATA
				SAND: Orange-tan, very fine to fine grained.		SP		
5		1.4/2	25.0	SAND: Orange-brown, moist. PEAT: Dark brown, organic odor.		PT	2,2,3,3	
10		0.4/2	0.0	SAND: Tan to brown to dark brown, very fine to fine grained, organic odor, wet.		SP	5,5,4,5	
15		1.8/2	0.0	SAND: Brown, very fine to fine grained, mixed with some peat, organic odor, wet.		SP	13,13,17,18	
20								
25								

TITLE: NADEP Pensacola		LOG of WELL: 322INE MW-5		BORING NO. SB9	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL			DATE STARTED: 1/10/82		COMPLTD: 1/10/82
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'- 15'	
TOC ELEV.: 20.89 FT.		MONITOR INST.: Porta Fid		PROTECTION LEVEL: D	
LOGGED BY: R. Durham		TOT DPTH: 15FT.		DEPTH TO ∇ 8.50 FT.	
WELL DEVELOPMENT DATE: 1/13/82			SITE: NADEP Pensacola		

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY SAMPLE	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0.0				SAND: Tan to orange-tan, very fine to fine grained.		SP		
5		2.0/2	8.0	SAND: Orange-brown to light brown, very fine to fine grained, wet at 6'.			3,3,4,3	
10		0.2/2	-	SAND: Dark brown, silty, peaty, organic odor, wet.		SM	2,1,2,2	
15		1.5/2	-	SAND: Brown, very fine to fine grained, organic odor, wet.		SM	8,24,28,20	
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 322INE MW-8		BORING NO. SB11	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/10/92		COMPLTD: 1/10/92	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'-15'		PROTECTION LEVEL: D	
TOC ELEV.: 20.39 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.		DPTH TO ∇ 8.88 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/10/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/8-IN	WELL DATA
			0.0	SAND: Very dark brown, fine to medium grained.		SP		
5		15/2	0.0	SAND: Very dark brown to grey, fine to medium grained, highly organic, silty with some clay, damp.		SM	5,6,7,7	
10		18/2	0.0	SAND: Tan to dark brown, fine to medium grained, highly organic, silty with some clay, saturated.			8,10,17,20	
15		20/2	0.0				10,17,18,18	
20		20/2	0.0	SAND: Brown to dark brown, fine to medium grained, some silt, some clay, saturated.			10,20,40,50	
25		18/2	0.0				28,55,-,-	
30								

TITLE: NADEP Pensacola				LOG of WELL: 3221NE MW-7		BORING NO. SB12	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groudwater Protection Inc./Orlando, FL				DATE STARTED: 1/10/92		COMPLTD: 1/10/92	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'- 15'		PROTECTION LEVEL: D	
TOC ELEV.: 21.81 FT.		MONITOR INST.: Porta Fld		TOT DPTH: 15FT.		DPTH TO ∇: 8.28 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/10/92				SITE: NADEP Pensacola	

DEPTH F.T.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
					SAND: Light brown, medium to coarse grained.		SP		
5			1.8/2	4.0	SAND: Light grey to dark brown, fine to medium grained, silty with some clay, highly organic, damp.		SM	5,7,8,11	POSTHOLE
10			2.0/2	0.0	SAND: Light grey to dark brown, fine to medium grained, silty with some clay, some organics, saturated.		SM	2,3,2,2	
15			1.8/2	5.0			SM	12,12,10,30	
20			1.5/2	8.0			SM	18,30,50,-	
25			1.8/2	0.0				7,13,10,23	
30									

TITLE: NADEP Pensacola				LOG of WELL: 3221NE MW-8		BORING NO. SB13	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/13/82		COMPLTD: 1/13/82	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'-15'		PROTECTION LEVEL: D	
TOC ELEV.: 24.17 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.		DPTH TO ∇: 10.28 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/13/82				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
3.0					SP		
5		1.5/2	SAND: Light tan to orange brown, very fine to fine grained.			3,5,3,3	
10		0.5/2	SAND/PEAT: Fine to medium grained tan sand underlain by dark brown peat, wet.		PT	7,4,3,3	
15		2.0/2	PEAT: Dark brown, mixed with clayey brown sand, very fine to fine grained SAND: Brown, very fine to fine grained.		SP	2,10,25,20	
20		-	SAND: Gray to brown, very fine to fine grained, wet.			10,30,50,-	
25							

TITLE: NADEP Pensacola		LOG of WELL: 322INE MW-9	BORING NO. SB5
CLIENT: SOUTHNAVFACENGCOM		PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL		DATE STARTED: 1/9/92	COMPLTD: 1/13/92
METHOD: HSA	CASE SIZE: 2 inch	SCREEN INT.: 5'- 15'	PROTECTION LEVEL: D
TOC ELEV.: 23.79 FT.	MONITOR INST.: Porta Fid	TOT DPTH: 15FT.	DPTH TO ∇ 8.99 FT.
LOGGED BY: R. Durham	WELL DEVELOPMENT DATE: 1/13/92		SITE: NADEP Pensacola

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				0.0	CONCRETE				
5			1.0/2	0.0	SAND: Light brown, medium grained, some mica.		SP	POSTHOLE	
								4,9,10,18	
10			1.6/2	28.0	PEAT: Dark brown to black, highly organic, wet in bottom of spoon.		PT		
								1,1,2,2	
15			1.5/2	8.0	SAND: Brown, fine to medium grained, organic odor, wet.		SP		
								3,11,10,7	
20									
25									

TITLE: NADEP Pensacola				LOG of WELL: 322INE MW-10		BORING NO. SB14	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/24/82		COMPLTD: 1/24/82	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 5'- 15'		PROTECTION LEVEL: D	
TOC ELEV.: 22.72 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.		DPTH TO ∇ 9.11 FT.	
LOGGED BY: A. Stamp		WELL DEVELOPMENT DATE: 1/24/82				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		2.0/2		SAND: brown, fine to medium grained, some silt, some clay.		SM	POSTHOLE	
							1,1,1,1	
10		1.3/2		SAND: Light brown to grey, fine to medium grained, some silt, some clay, saturated at 10'.			7,12,13,15	
15		0.5/2		SAND: Light grey, fine to medium grained, saturated.		SP	7,8,7,7	
20		0.8/2					3,30,40,31	
25		0.8/2					8,38,50,-	
30								

TITLE: NADEP Pensacola				LOG of WELL: 3221NE MW-11		BORING NO. SB15	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando,FL				DATE STARTED: 1/24/92		COMPLTD: 1/24/92	
METHOD: HSA		CASE SIZE: 2 Inch		SCREEN INT.: 5' - 15'		PROTECTION LEVEL: D	
TOC ELEV.: 22.43 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 15FT.		DPTH TO ∇ 8.81 FT.	
LOGGED BY: A. Stamp		WELL DEVELOPMENT DATE: 1/24/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
				CONCRETE				
				SAND: Tan to red, fine to medium grained, some silt, some clay.		SM	POSTHOLE	
5		0.8/2		SAND: Light grey, fine to medium grained, some silt, some clay.			4,8,8,11	
10		0.5/2		SAND: Tan, fine to medium grained, some silt, some clay.			10,13,10,3	
15		1.0/2					8,7,9,12	
20		1.0/2				SP	14,9,12,24	
25		0.6/2		SAND: Light brownish-grey, very fine to fine grained.			17,34,50,-	

TITLE: NADEP Pensacola		LOG of WELL: 3221NE MW-12D		BORING NO. SB18	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL			DATE STARTED: 2/7/92		COMPLTD: 2/7/92
METHOD: HSA		CASE SIZE: 2 Inch		SCREEN INT.: 30'- 35'	
TOC ELEV.: 23.83 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 35FT.	
LOGGED BY: A. Stamp		WELL DEVELOPMENT DATE: 2/7/92			SITE: NADEP Pensacola

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY SAMPLE	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/8-IN	WELL DATA
5				SAND: Light grey to brown, fine to medium grained, some silt.		SM	POSTHOLE	
		1.3/2	0.0	SAND: Light grey, fine to medium grained, some mica, damp.		SP	3,7,8,8	
10				SAND W/ PEAT: Black, fine to medium grained, highly organic, saturated.		PT	1,1,1,1	
		2.0/2	25.0			SP		
15				SAND: Light brown, fine to medium grained, some organics, saturated.		SM	1,3,15,18	
		1.8/2	27.0					
20				SAND: Light grey to brown, fine to medium grained, some silt, saturated.		SM	2,3,5,14	
		2.0/2	20.0					
25				SAND: Light grey to brown, fine to medium grained, some silt, saturated.			50,-,-,-	
		2.0/2	30.0					
30							27,50,-,-	
		2.0/2	8.0					
35				SAND: Brown, fine to medium grained, some silt, organics, saturated.			7,22,28,38	
		1.2/2	0.0					
40								

TITLE: NADEP Pensacola				LOG of WELL: 3221NE PZ-1		BORING NO. SB2	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc.				DATE STARTED: 1/8/92		COMPLTD: 1/8/92	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 7' - 17'		PROTECTION LEVEL: D	
TOC ELEV.: 32.93 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 17FT.		DPTH TO ∇ 8.12 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0.0				SAND: Tan to brown-orange, very fine to fine grained, some organics.		SP		
5		1.5/2	2.0	SAND: Tan to brown-orange, very fine to fine grained, no organics, damp at 7.			4,4,8,7	
10		2.0/2	-	SAND: Grey, fine grained, organics.			2,2,1,2	
15		1.2/2	75.0	PEAT: Dark brown, roots visible, underlain by brown sand, wet, organic odor.		PT	3,9,17,18	
20								
25								

TITLE: NADEP Pensacola				LOG of WELL: 3221NE PZ-2		BORING NO. SB3	
CLIENT: SOUTHNAVFACENGCOM				PROJECT NO: 7527-30			
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/8/92		COMPLTD: 1/8/92	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 7' - 17'		PROTECTION LEVEL: D	
TOC ELEV.: 32.20 FT.		MONITOR INST.: Porta Fld		TOT DPTH: 17FT.		DPTH TO ∇ 7.28 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE	RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0.0					SAND: Tan to light orange-tan, very fine to fine grained.		SP		
5			1.8/2	0.0	SAND: Off-white to light brownish-grey, very fine to fine grained.			3,4,8,8	
10			2.0/2	15.0	SAND: Grey to light brown, very fine to fine grained, wet.		PT	2,1,1,1	
15			1.8/2	25.0	SANDY PEAT: Dark brown with dark grey sand, fine grained, organic odor.				
					SAND: Brown to light brown, very fine to fine grained, strong organic odor, wet.		SP	5,15,17,15	
20									
25									

TITLE: NADEP Pensacola				LOG of WELL: 322INE PZ-3		BORING NO. SB8	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc.				DATE STARTED: 1/9/92		COMPLTD: 1/9/92	
METHOD: HSA		CASE SIZE: 2 inch		SCREEN INT.: 7' - 17'		PROTECTION LEVEL: D	
TOC ELEV.: 31.83 FT.		MONITOR INST.: Porta Fid		TOT DPTH: 17FT.		DPTH TO ∇ 9.71 FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: 1/9/92				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	SAMPLE RECOVERY	HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
0.0				SAND: Tan to light yellow-brown, very fine to fine grained.		SP	POSTHOLE	
5		18/2	0.0	SAND: Yellow-brown to orange-brown to off-white, very fine to fine grained.		SP	5,6,7,7	
10		15/2	330.0	SAND: Orange-brown to medium grey to off-white, organic odor.		SP	2,2,3,3	
15		10/2	-	SAND: Off-white, very fine to fine grained, organic odor.		SP	7,8,18,20	
20								
25								

TITLE: NADEP Pensacola				LOG of WELL:		BORING NO. SB8	
CLIENT: SOUTHNAVFACENGCOM						PROJECT NO: 7527-30	
CONTRACTOR: Groundwater Protection Inc./Orlando, FL				DATE STARTED: 1/9/92		COMPLTD: 1/9/92	
METHOD: HSA		CASE SIZE:		SCREEN INT.:		PROTECTION LEVEL: D	
TOC ELEV.: FT.		MONITOR INST.: Porta Fid		TOT DPTH: 22FT.		DPTH TO ∇ FT.	
LOGGED BY: R. Durham		WELL DEVELOPMENT DATE: NA				SITE: NADEP Pensacola	

DEPTH FT.	LABORATORY SAMPLE ID.	RECOVERY HEADSPACE (ppm)	SOIL/ROCK DESCRIPTION AND COMMENTS	LITHOLOGIC SYMBOL	SOIL CLASS	BLOWS/6-IN	WELL DATA
5		13/2	0.0		SP		POSTHOLE
			SAND: Orange-brown to light brown, very fine to fine grained.				
			SAND: Light brown to grey, fine to medium grained, some mica.				2,2,2,1
10		15/2	0.0		SP		4,9,14,14
			SAND: Light grey, medium to coarse grained, saturated.				
15		2.0/2	8.0		SP		13,24,34,30
			SAND: Off-white to light brown, very fine to fine grained, wet.				
20		2.0/2	-				8,12,16,16
			SAND: Light brown, very fine to fine grained, wet.				
25							

APPENDIX C

INVESTIGATIVE METHODOLOGIES AND PROCEDURES

Soil Boring Methods

Boreholes were advanced using 4.25-inch inside diameter, hollow-stem augers using a rotary drill rig. Soil samples were collected from each borehole using a standard penetration test (SPT) split-spoon sampler. SPT samples were generally collected at 5-foot intervals to the total depth of the well. The soil samples collected above the water table were placed in 16-ounce glass jars and head space analyses were performed using an organic vapor analyzer (OVA) with a flame ionization detector (FID) following Florida Department of Environmental Regulation (FDER) Chapter 17-770.200(2), Florida Administrative Code (FAC) guidelines. Samples from below the water table were analyzed using a portable gas chromatograph (GC) calibrated to detect benzene, ethyl benzene, toluene, and xylene (BETX) to the part per billion (ppb) level. The purpose of the screening procedure was to optimize monitoring well placement during the investigation.

Monitoring Well Construction

Monitoring wells were installed in many of the boreholes drilled at the NADEP facility. All monitoring wells installed during the investigation were constructed of 2-inch inner diameter, schedule 40, polyvinyl chloride (PVC) casing with flush-threaded joints and 0.010-inch machine-slotted screen. Shallow wells were constructed with 10 feet of screen. Deeper wells were constructed with 5 feet of screen. PVC well casings extend from the top of the screen to land surface. A 20/30 grade silica sand filter pack was placed in the annular space to approximately 2 to 3 feet above the top of the screen. A 1- to 2-foot thick bentonite seal was then placed on top of the filter pack. The remaining annular space was grouted to the surface with a neat cement grout. A protective traffic-bearing vault was installed to complete each well location. In concreted areas, the well pad consisted of 6-inch thick reinforced concrete around the traffic-bearing vault to the depth of the surrounding concrete. Each monitoring well is equipped with a locking well cap and a padlock. Figure C-1 depicts a typical shallow monitoring well installation for the site.

Water Level Measurements

The groundwater levels were measured using an electric water level indicator and an engineering tape divided into increments of 0.01 foot. The wells were checked for the presence of free product by visual observation of a groundwater sample taken from each well using an extruded Teflon™ bailer. Water level elevations were calculated by subtracting the measured depth to groundwater from the elevation at the top of the well casing.

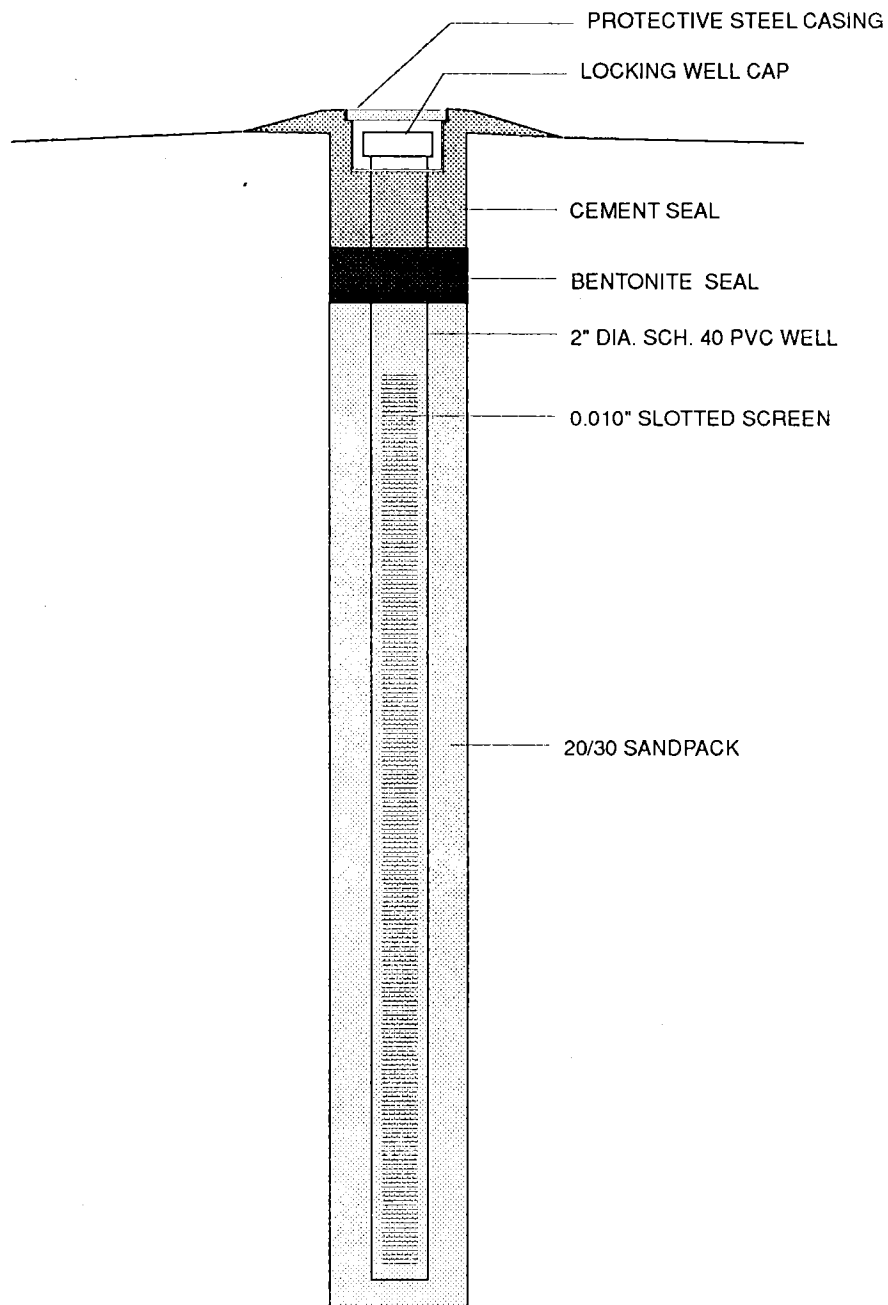


FIGURE C-1
MONITORING WELL
CONSTRUCTION DIAGRAM



CONTAMINATION
ASSESSMENT REPORT
SITE 3221NE
NADEP PENSACOLA
PENSACOLA, FLORIDA

Groundwater Sampling

The groundwater samples were collected in accordance with ABB Environmental Services, Inc. (ABB-ES), Florida Department of Environmental Regulation (FDER)-approved Comprehensive Quality Assurance Plan (CompQAP). The monitoring wells were purged with a Teflon™ bailer. Purging continued until a minimum of three well volumes had been removed from the well. Groundwater samples were collected using an extruded Teflon™ bailer. The samples were placed into appropriate containers, properly preserved, and placed on ice. Samples were then shipped to Wadsworth/Alert Laboratories in Tampa, Florida. All groundwater samples collected were analyzed for constituents of the waste oil and unknown analytical group as outlined in FDER Chapter 17-770, Florida Administrative Code (FAC).

Slug Test Procedures

The slug test developed by Bouwer and Rice (1976) permits the measurement of saturated hydraulic conductivity (K) within a single well. The test method used is known as a rising head test and is performed by quickly withdrawing a volume of water (slug) from the well and measuring the subsequent rate of rise of the water level in the well. Bouwer (1989) recommends the rising head slug test for wells with screened intervals that are only partially submerged into unconfined aquifers.

The slug was constructed of 1-inch outside diameter PVC pipe, 5 feet in length, filled with sand, and capped watertight at both ends. The water level changes in the monitoring wells were recorded with a data logger and pressure transducer. The pressure transducer was suspended just above the bottom of the well and an initial water level was recorded prior to beginning the test. The slug was then lowered into the well until it was totally submerged beneath the water table. Water levels were then observed until recovery to the original level. Generally, recovery occurred within 3 to 4 seconds. Following stabilization, the slug was quickly removed with water level measurements recorded over time until the water level returned to the original level. Three rising head tests were conducted for each well in order to obtain an average recovery response.

APPENDIX D

AQUIFER PARAMETER CALCULATIONS

Aquifer Parameter Calculations

Hydraulic gradient

Water table elevations were plotted on a water table contour map where flow lines (depicting groundwater flow direction) were drawn perpendicular to the groundwater elevation contours. The groundwater hydraulic gradient was calculated by subtracting the differences in groundwater elevation (in feet) between two points on the map and dividing the elevation difference by the distance between two points to obtain a resulting gradient in feet per foot. Water elevation data collected on February 27 and March 30, 1992, were used to calculate hydraulic gradients at the site. For each date, three traverses were made perpendicular to equipotential contour lines to calculate an average site hydraulic gradient. For each traverse, the hydraulic gradient was calculated as follows:

$$i = \frac{(h_1 - h_2)}{d} \quad (1)$$

where

- i = hydraulic gradient (feet per foot [ft/ft]),
- h_1 = water table elevation, upgradient (feet),
- h_2 = water table elevation, downgradient (feet), and
- d = horizontal distance (feet) between h_1 and h_2 along a flow line.

Hydraulic gradients calculated in this manner varied from 2.3×10^{-3} ft/ft to 2.6×10^{-3} ft/ft. The average hydraulic gradient at the site was calculated to be 2.5×10^{-3} ft/ft.

Hydraulic conductivity

Hydraulic conductivity from data gathered in the slug tests was calculated following the methods of Bouwer and Rice (1976) and Bouwer (1989) for partially penetrating wells screened in unconfined aquifers. The following well information was needed to assess the hydraulic conductivity:

- radius of well casing (r_c),
- radius of borehole ($r_w = r_c$ plus radial thickness of the sand pack surrounding the well screen),
- length of screened interval below the water table (L_e),
- effective well radius (r_e),
- depth of well below the water table (L_w),
- depth to confining unit or bottom of aquifer below the static water table (H), and

- plot of time versus the logarithm of y, where y is the difference between the static water level outside the well and the water level inside the well.

Figure D-1 is a well diagram depicting many of the above listed parameters. Calculations were made assuming that $L_w < H$. Hydraulic conductivity, K, was calculated from the above parameters as follows:

$$K = [r_c^2 \ln(\frac{r_e}{r_w}) - 2L_e] [\frac{1}{t} \ln(\frac{y_0}{y_t})] \quad (2)$$

where

y_0 = y at time zero, and
 y_t = y at time t.

The effective well radius, r_e , and the term $((1/t) \ln (y_0/y_t))$ were derived by using the computer program AQTESOLV™ (Geraghty & Miller, Inc., 1989). This computer program follows procedures and assumptions outlined by Bouwer (1989).

Slug test graphs are attached at the end of this appendix. Values of y were calculated for a particular time, t, and plotted on the graph. The computer program selects a "best-fit" line through the data points by linear regression along a "straight-line" portion of the graph. The slope of the "best-fit" line is used to calculate the hydraulic conductivity, K.

Three slug tests each were performed inside wells PEN-3221NE-MW6, PEN-3221NE-MW9, PEN-3221NE-MW10, and PEN-3221NE-MW12D. Hydraulic conductivity, K, is reported in feet per minute (ft/min) on the slug test graphs, and was recalculated to feet per day (ft/day). K was found to vary from 7.8 ft/day to 6.8×10^1 ft/day with an average K of 3.3×10^1 ft/day.

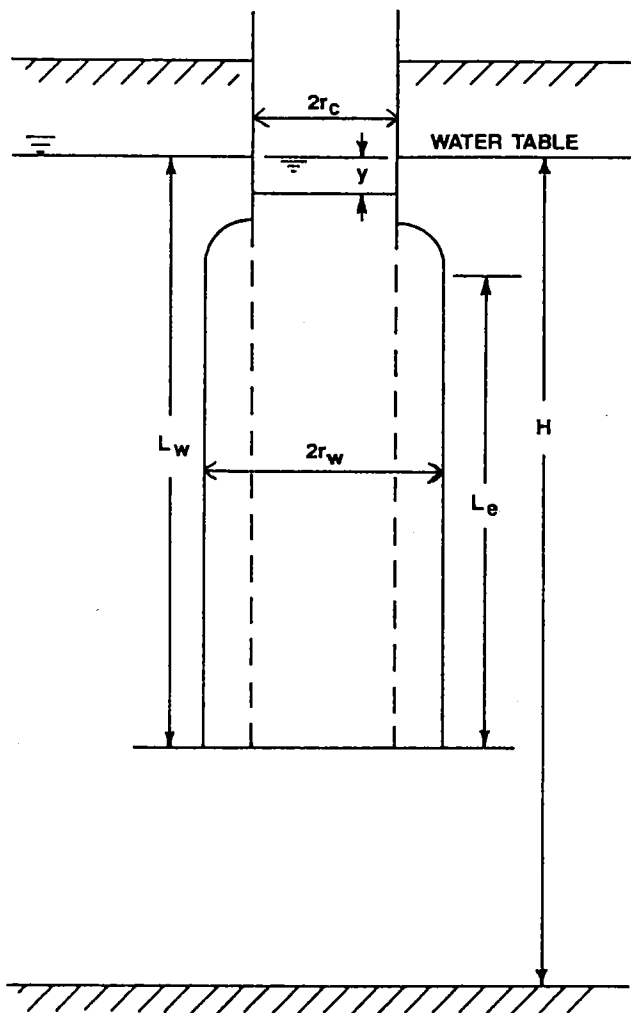
Average pore water velocity

Estimates of average pore water velocity were obtained using the following formula:

$$V = \frac{(K \cdot i)}{n} \quad (3)$$

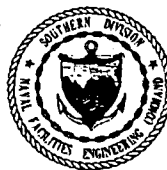
where

V = seepage velocity in ft/day,
 K = hydraulic conductivity in ft/day,
 i = hydraulic gradient, and
 n = estimated porosity.



- r_c -radius of well.
- r_w -radius of well + total thickness of the sand/gravel pack.
- L_e -length of screened interval below the water table.
- L_w -depth of well below water table.
- H -depth to confining unit below the water table.
- y -difference between static water level outside well and water level inside well.

FIGURE D-1
DEFINITIONS OF SLUG TEST
PARAMETERS (from Bouwer, 1989)



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PENSACOLA, FLORIDA

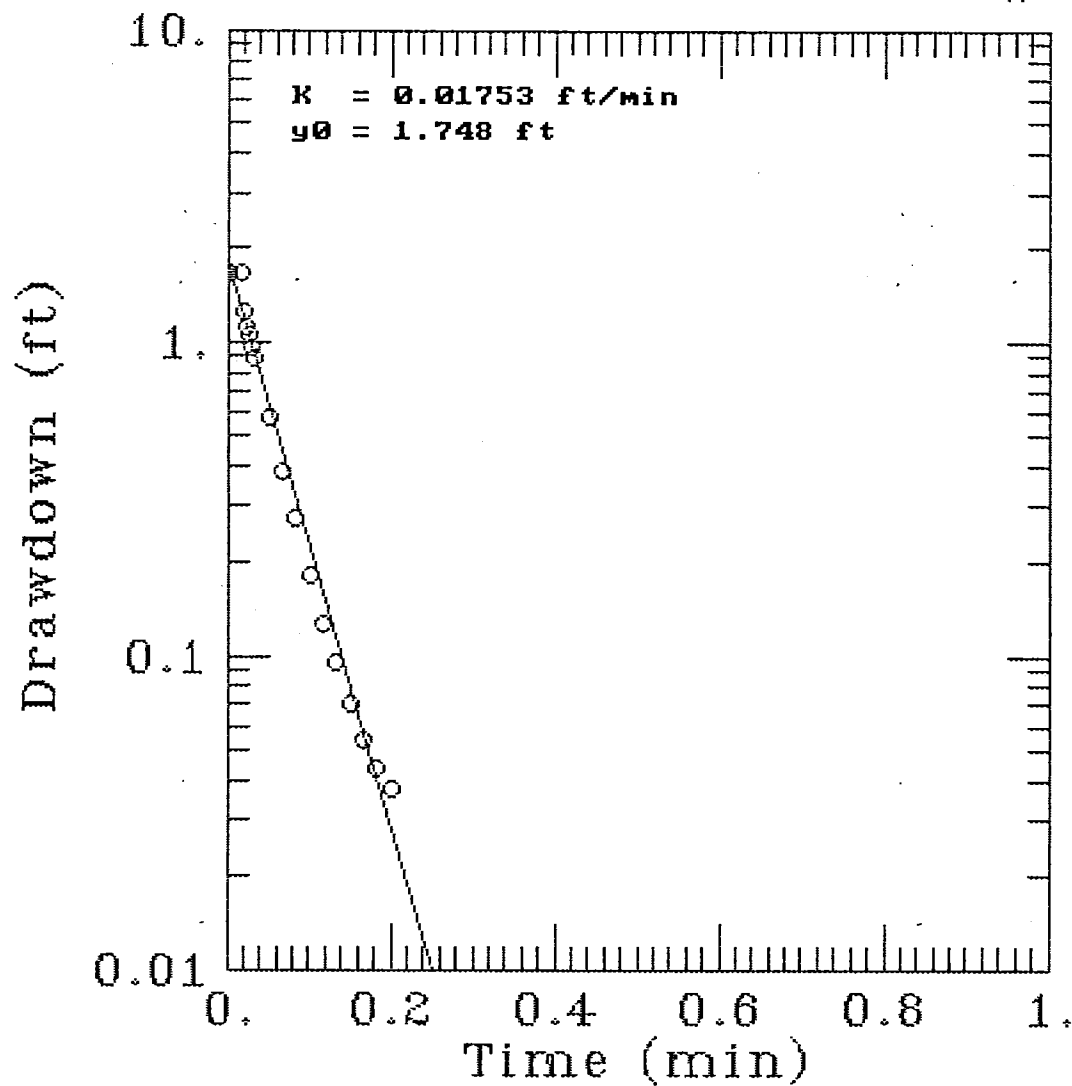
Assuming an estimated porosity of 25 percent, an average hydraulic gradient of 2.5×10^{-3} , and an average hydraulic conductivity of 3.3×10^1 ft/day, the average pore water velocity is calculated as follows:

$$v = \frac{3.3 \times 10^1 \text{ ft/day} * 2.5 \times 10^{-3} \text{ ft/ft}}{0.25}$$

$$V = 3.3 \times 10^{-1} \text{ ft/day}$$

SLUG TEST PLOTS

PEN-3221NE-MW-6 RUN #1



AQTESOLV



GERAGHTY
& MILLER, INC.



Modeling Group

08:48:53

.....

```
Data set..... A:3221NE61.SET
Data set title.... PEN-3221NE-MW-6 RUN #1
```

Knowns and Constants:

No. of data points.....	16		
Radius of well casing.....	0.083		
Radius of well.....	0.334		
Aquifer saturated thickness.....	8.26		
Well screen length.....	10		
Static height of water in well.....	8.26		
Log (Re/Rw)	2.447		
A, B, C.....	0.000,	0.000,	1.967

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044

Bouwer-Rice (Unconfined Aquifer Slug Test)

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044

VISUAL MATCH PARAMETER ESTIMATES

```

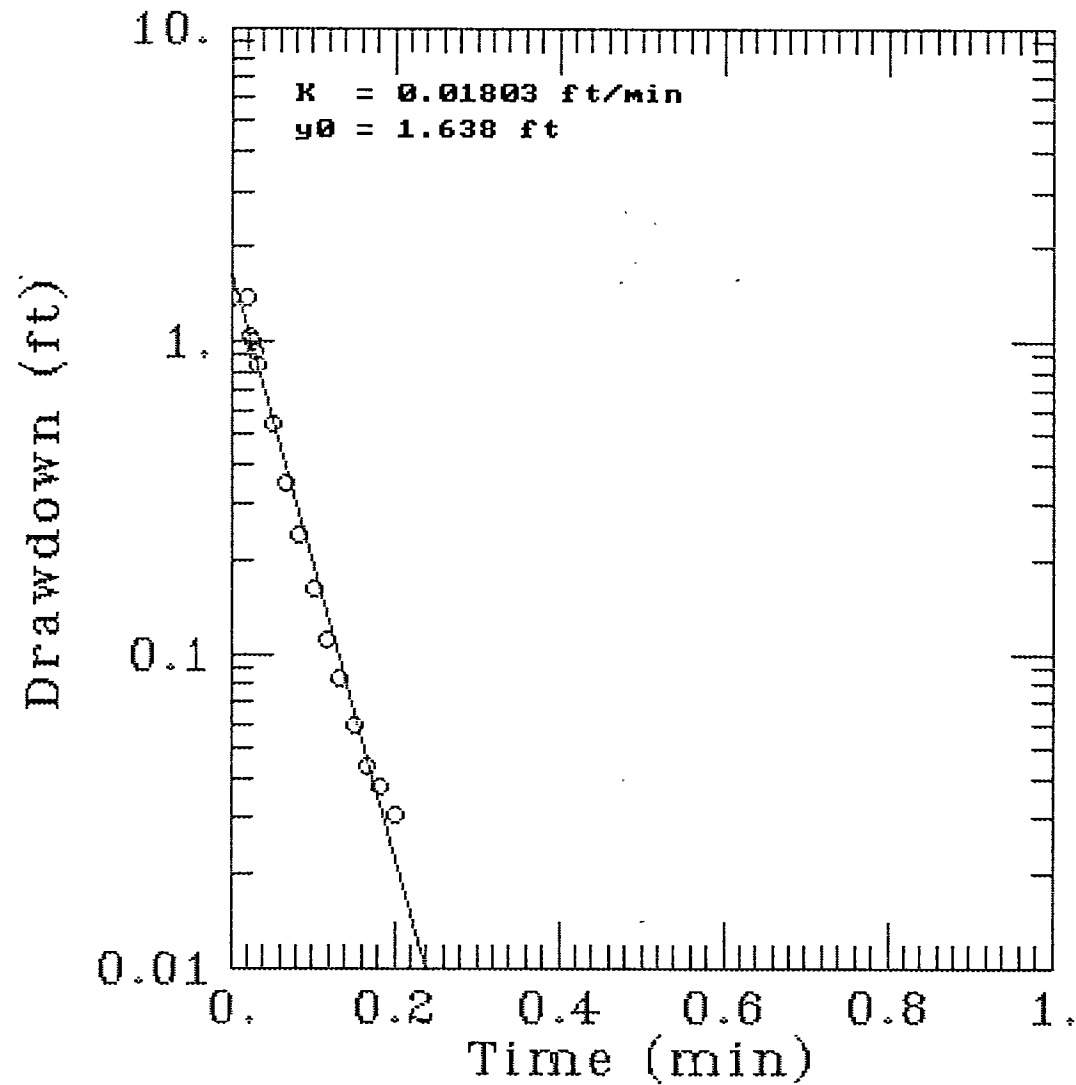
      Estimate
K   =  1.7530E-002
y0  =  0.0000E+000

```

```
K    = 1.75302E-002
y0   = 1.74807E+000
```

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.748E+000	1.000E+000	1.628E-009		

PEN-3221NE-MW-6 RUN #2



AQTESOLV



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Modeling Group

A Q T E S O L V R E S U L T S
Version 1.10

08:55:09

TEST DESCRIPTION

```

Data set..... A:3221NE62.SET
Data set title.... PEN-3221NE-MW-6 RUN #2

```

Knowns and Constants:

No. of data points.....	15		
Radius of well casing.....	0.083		
Radius of well.....	0.334		
Aquifer saturated thickness.....	8.26		
Well screen length.....	10		
Static height of water in well.....	8.26		
Log(Re/Rw).....	2.447		
A, B, C.....	0.000,	0.000,	1.967

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

```

      Estimate
K   =  1.8032E-002
y0  =  0.0000E+000

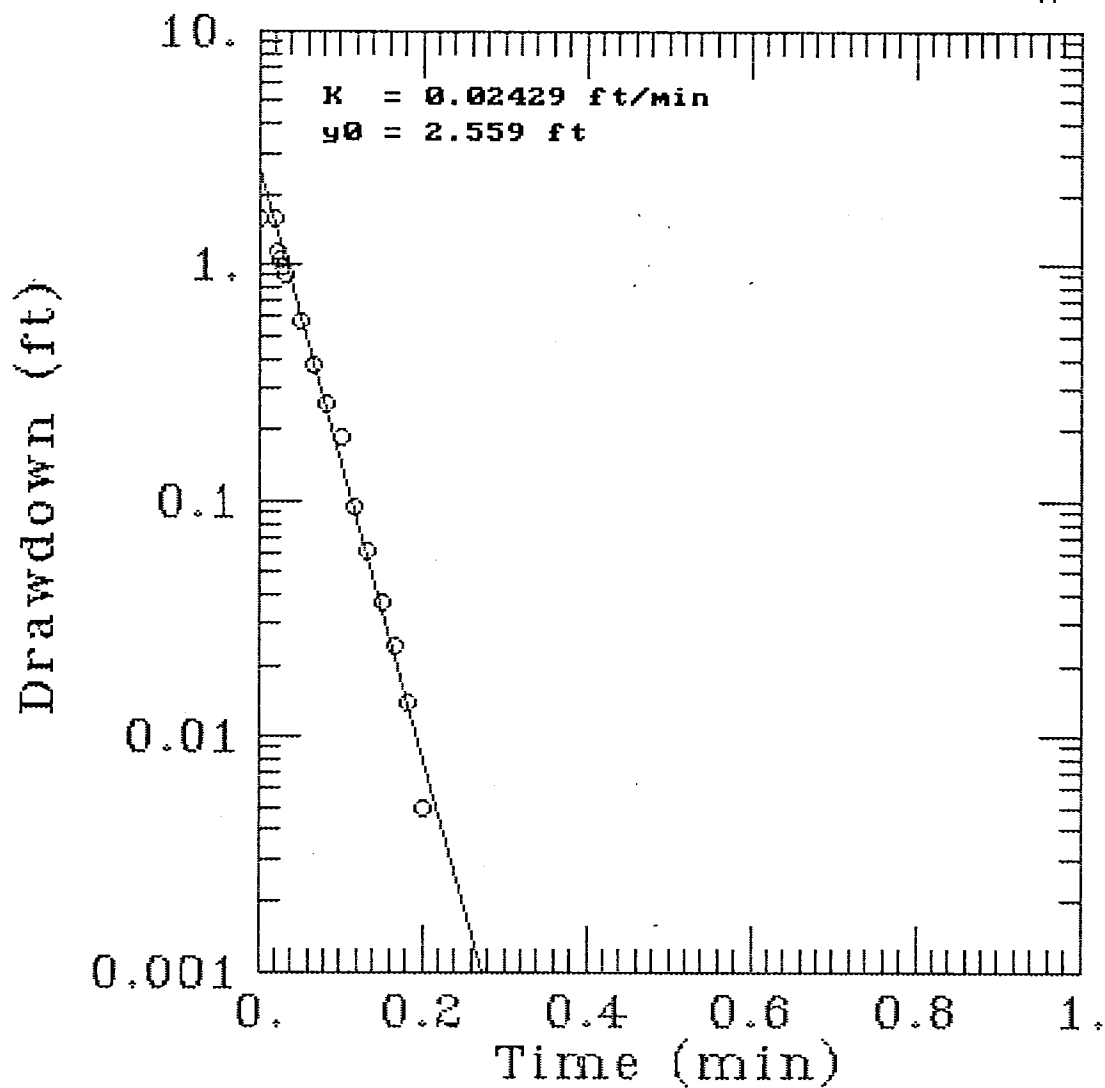
```

TYPE CURVE DATA

```
K    = 1.80320E-002
y0   = 1.63770E+000
```

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.638E+000	1.000E+000	8.411E-010		

PEN-3221NE-MW-6 RUN #3



AQTESOLV



GERAGHTY
& MILLER, INC.



Modeling Group

```
A Q T E S O L V      R E S U L T S
      Version  1.10
```

09:02:19

TEST DESCRIPTION

```
Data set..... 'A:3221NE63.SET'
Data set title.... PEN-3221NE-MW-6 RUN #3
```

Knowns and Constants:

No. of data points.....	15		
Radius of well casing.....	0.083		
Radius of well.....	0.334		
Aquifer saturated thickness.....	8.26		
Well screen length.....	10		
Static height of water in well.....	8.26		
Log(Re/Rw).....	2.447		
A, B, C.....	0.000,	0.000,	1.967

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

```

      Estimate
K   =  2.4293E-002
y0  =  0.0000E+000

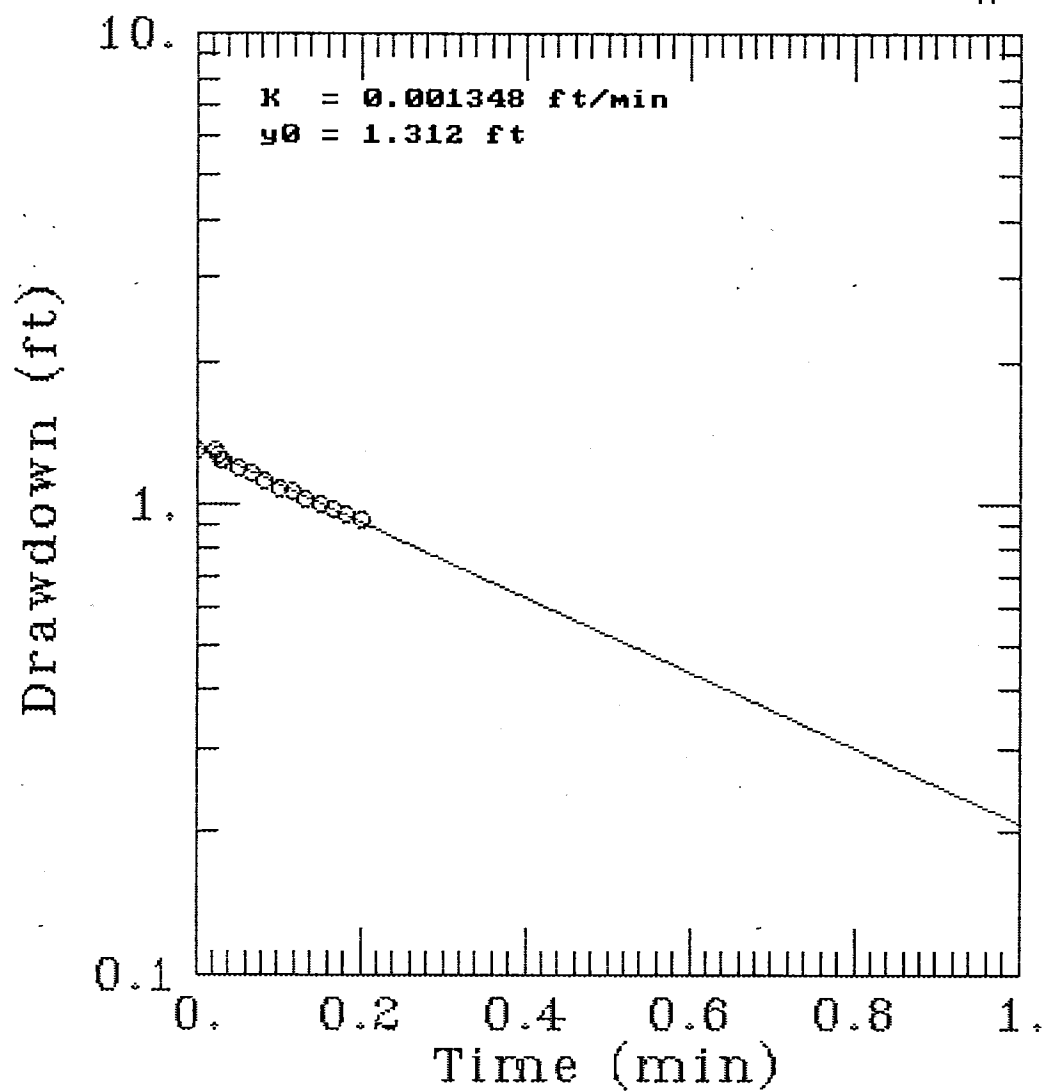
```

TYPE CURVE DATA

```
K    = 2.42934E-002
y0  = 2.55934E+000
```

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.559E+000	1.000E+000	7.819E-013		

PEN-3221NE-MW-9 RUN #1



AQTESOLV



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Modeling Group

```
A Q T E S O L V      R E S U L T S
      Version  1.10
```

17:03:32

TEST DESCRIPTION

```
Data set..... A:3221NE91.SET
Data set title.... PEN-3221NE-MW-9 RUN #1
```

Knowns and Constants:

No. of data points.....	14		
Radius of well casing.....	0.083		
Radius of well.....	0.334		
Aquifer saturated thickness.....	5.11		
Well screen length.....	10		
Static height of water in well.....	5.11		
Log(Re/Rw).....	2.132		
A, B, C.....	0.000,	0.000,	1.967

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

```

      Estimate
K   =  1.3475E-003
y0  =  0.0000E+000

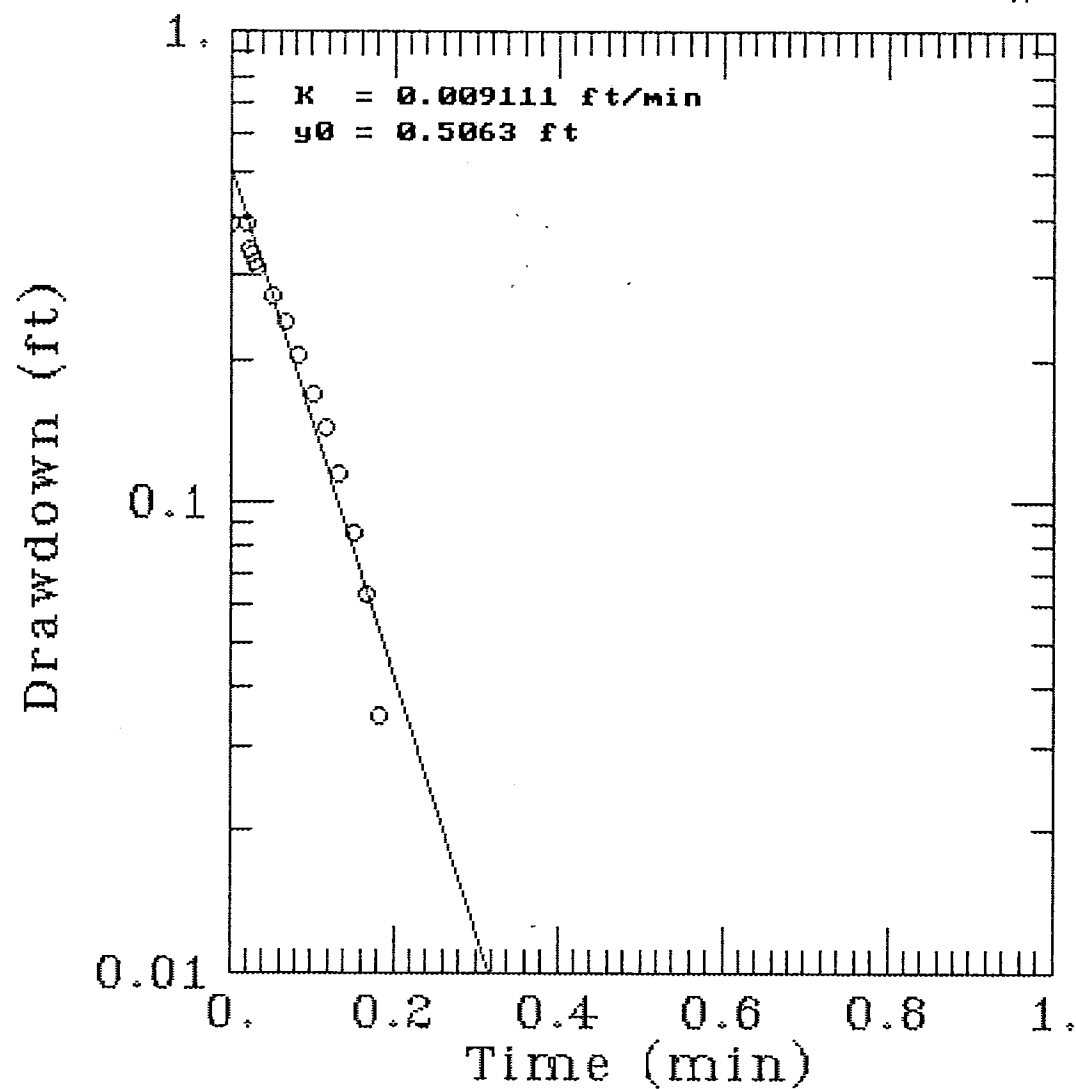
```

TYPE CURVE DATA

```
K    = 1.34750E-003
y0   = 1.31193E+000
```

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.312E+000	1.000E+000	2.095E-001		

PEN-3221NE-MW-9 RUN #2



AQTESOLV

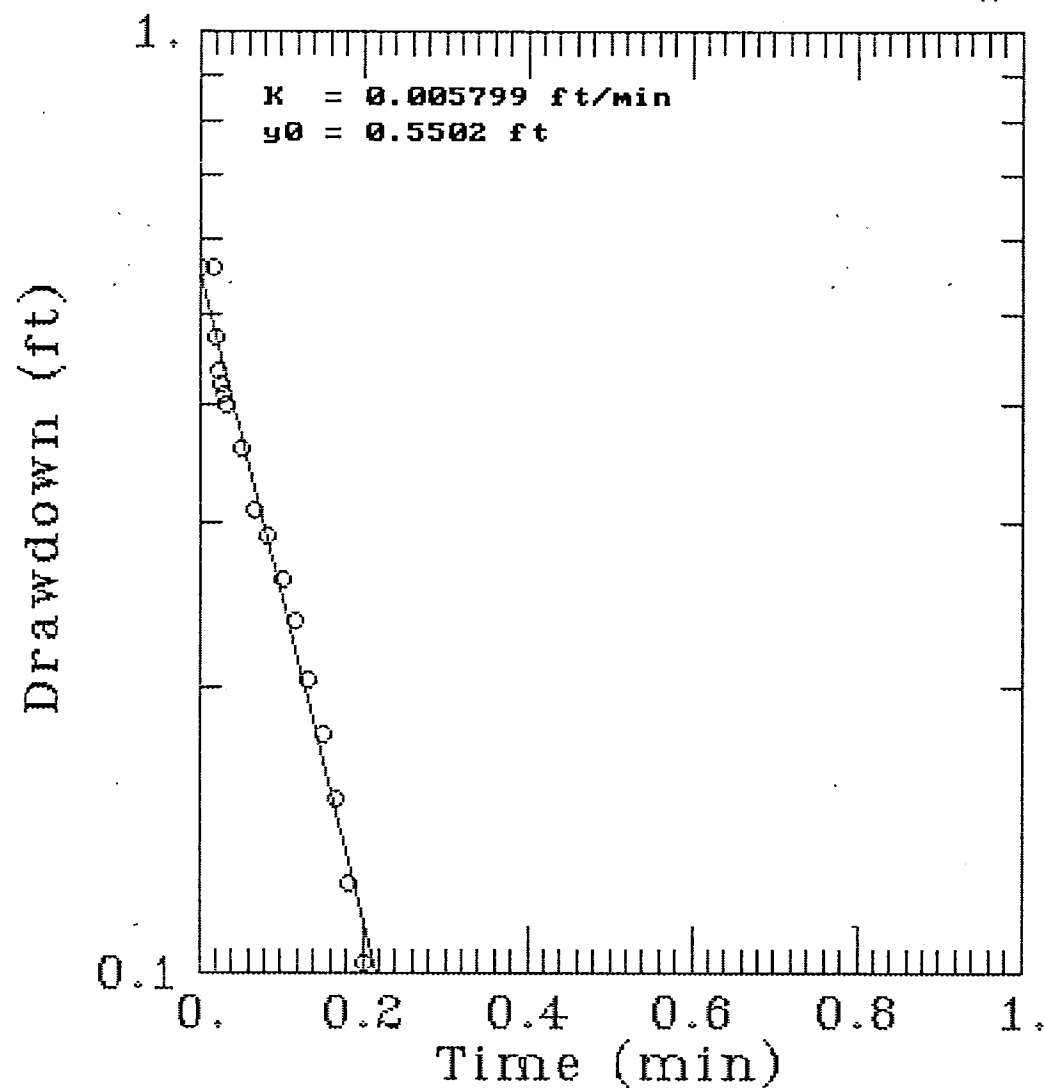


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PEN-3221NE-MW-9 RUN #3



AQTESOLV



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& MILLER, INC.



Modeling Group

```
A Q T E S O L V      R E S U L T S
      Version  1.10
```

17:12:30

TEST DESCRIPTION

Knowns and Constants:

No. of data points.....	16		
Radius of well casing.....	0.083		
Radius of well.....	0.334		
Aquifer saturated thickness.....	5.11		
Well screen length.....	10		
Static height of water in well.....	5.11		
Log (Re/Rw)	2.132		
A, B, C.....	0.000,	0.000,	1.967

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

```

      Estimate'
K   =  5.7989E-003
y0  =  0.0000E+000

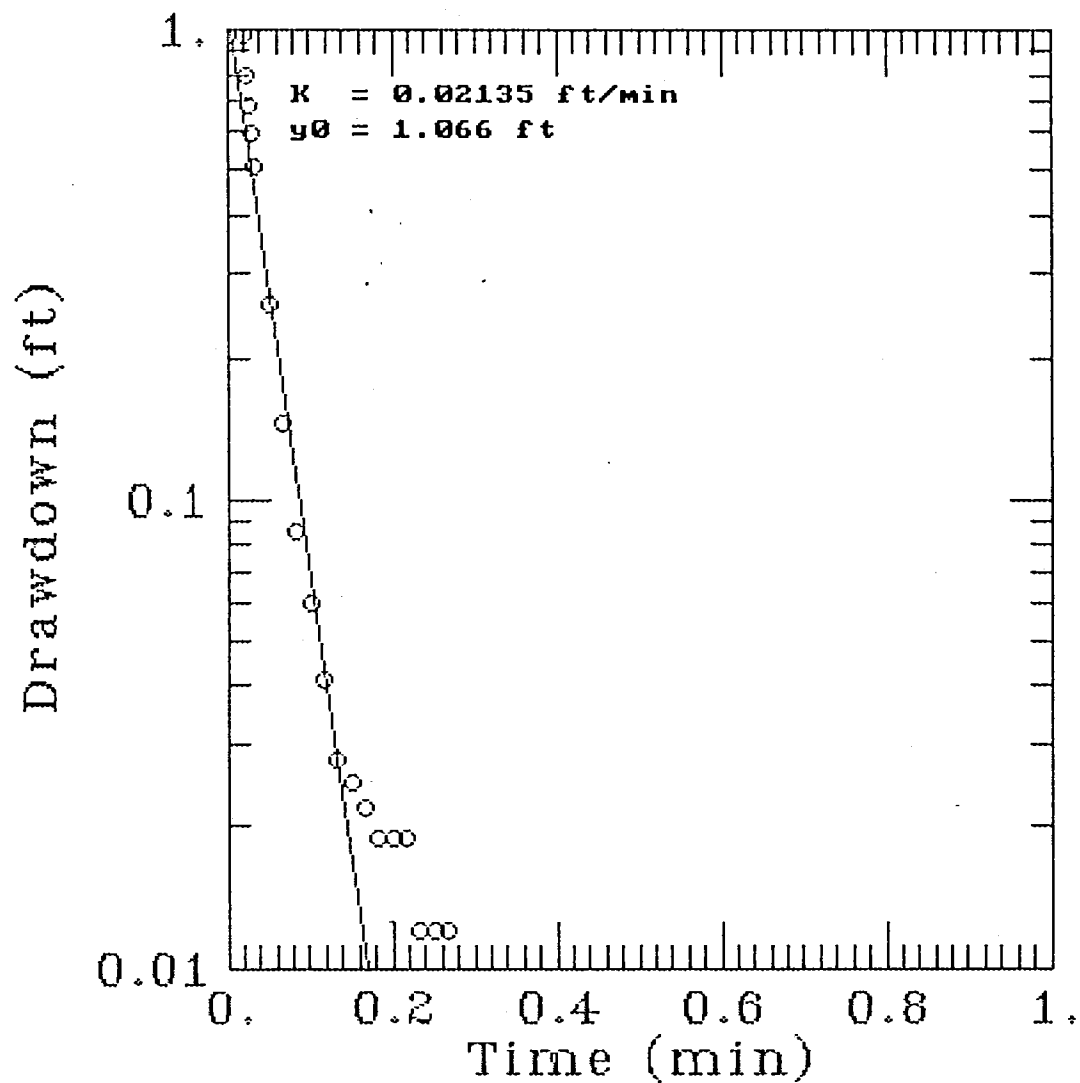
```

TYPE CURVE DATA

```
K    = 5.79894E-003
y0  = 5.50228E-001
```

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	5.502E-001	1.000E+000	2.050E-004		

PEN-3221NE-MW-10 RUN #1



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A Q T E S O L V R E S U L T S
Version 1.10

07/28/92

16:52:41

=====
TEST DESCRIPTION
=====

Data set..... A:3221N101.SET
Data set title..... PEN-3221NE-MW-10 RUN #1

Knowns and Constants:

No. of data points..... 19
Radius of well casing..... 0.083
Radius of well..... 0.334
Aquifer saturated thickness..... 6
Well screen length..... 10
Static height of water in well..... 6
Log(Re/Rw)..... 2.239
A, B, C..... 0.000, 0.000, 1.967

=====
ANALYTICAL METHOD
=====

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====
RESULTS FROM VISUAL CURVE MATCHING
=====

VISUAL MATCH PARAMETER ESTIMATES

Estimate
K = 1.3998E-002
y0 = 0.0000E+000

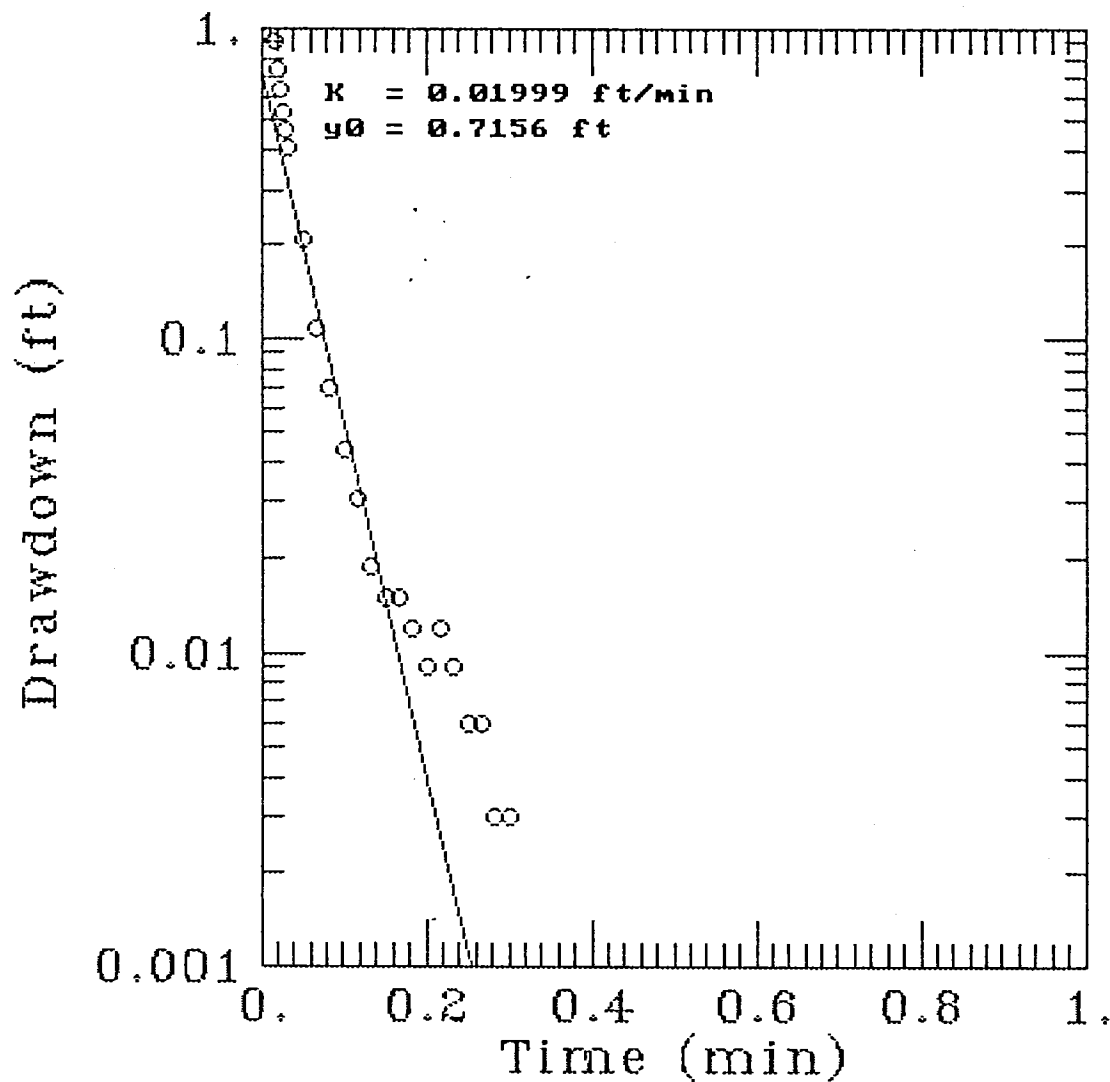
TYPE CURVE DATA

K = 2.13475E-002
y0 = 1.06614E+000

Time Drawdown Time Drawdown Time Drawdown

0.000E+000 1.066E+000 1.000E+000 1.021E-012

PEN-3221NE-MW-10 RUN #2



AQTESOLV



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Modeling Group

A Q T E S O L V R E S U L T S
Version 1.10

07/28/92

16:24:43

=====
TEST DESCRIPTION
=====

Data set..... A:3221N102.SET
Data set title..... PEN-3221NE-MW-10 RUN #2

Knowns and Constants:

No. of data points..... 22
Radius of well casing..... 0.083
Radius of well..... 0.334
Aquifer saturated thickness..... 6
Well screen length..... 10
Static height of water in well..... 6
Log(Re/Rw)..... 2.239
A, B, C..... 0.000, 0.000, 1.967

=====
ANALYTICAL METHOD
=====

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====
RESULTS FROM VISUAL CURVE MATCHING
=====

VISUAL MATCH PARAMETER ESTIMATES

Estimate
K = 1.4989E-002
y0 = 0.0000E+000

TYPE CURVE DATA

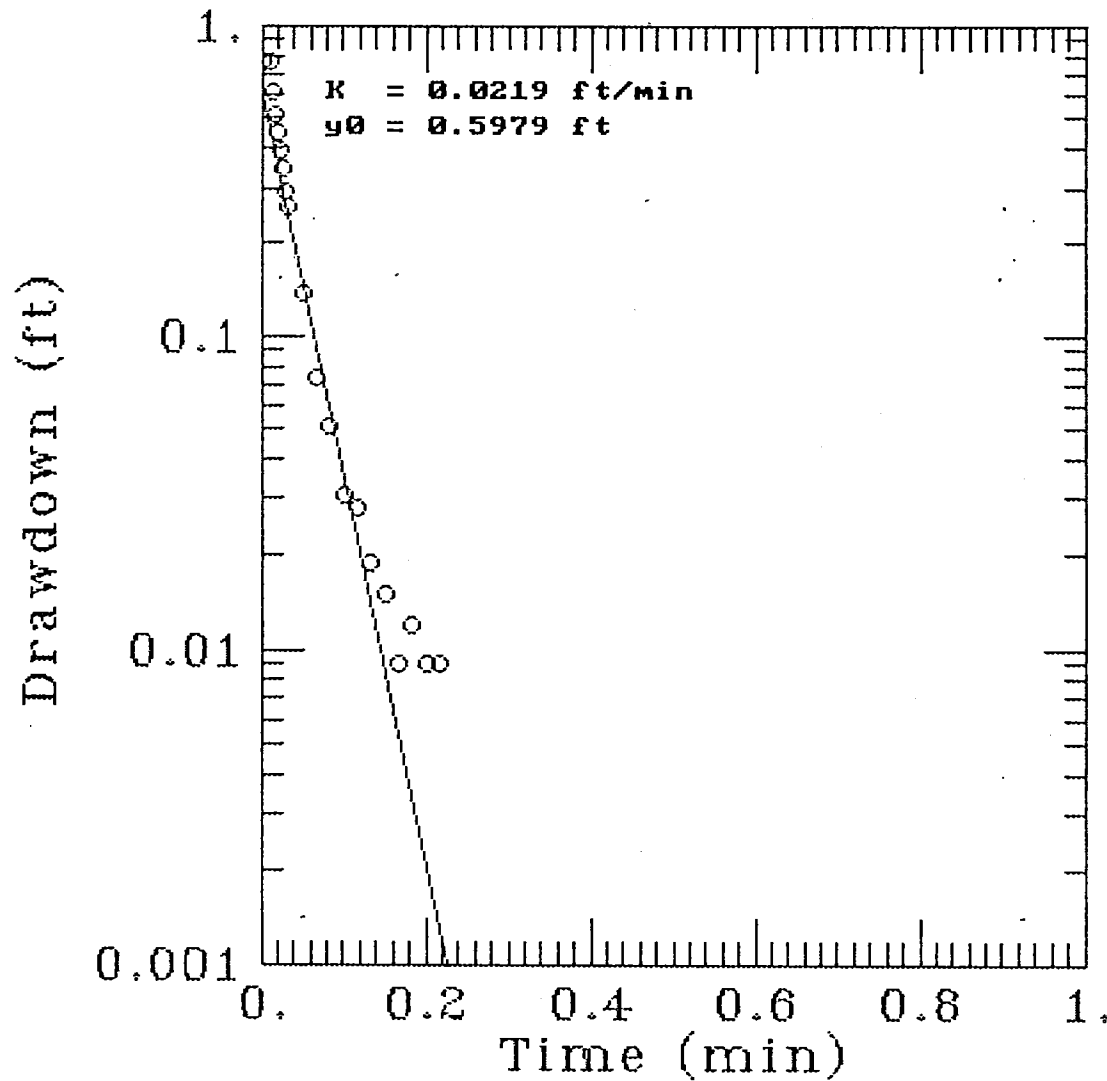
K = 1.99856E-002
y0 = 7.15628E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	7.156E-001	1.000E+000	4.006E-012		

TYPE CURVE DATA

K = 1.99856E-002
y0 = 7.15628E-001

PEN-3221NE-MW-10 RUN #3



AQTESOLV



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Modeling Group

A Q T E S O L V R E S U L T S
Version 1.10

07/28/92

16:43:10

=====

TEST DESCRIPTION

Data set.....A:3221N103.SET
Data set title..... PEN-3221NE-MW-10 RUN #3

Knowns and Constants:

No. of data points..... 19
Radius of well casing..... 0.083
Radius of well..... 0.334
Aquifer saturated thickness..... 6
Well screen length..... 10
Static height of water in well..... 6
Log(Re/Rw)..... 2.239
A, B, C..... 0.000, 0.000, 1.967

=====

ANALYTICAL METHOD

Bouwer-Rice (Unconfined Aquifer Slug Test)

=====

RESULTS FROM VISUAL CURVE MATCHING

VISUAL MATCH PARAMETER ESTIMATES

Estimate
K = 1.7509E-002
y0 = 0.0000E+000

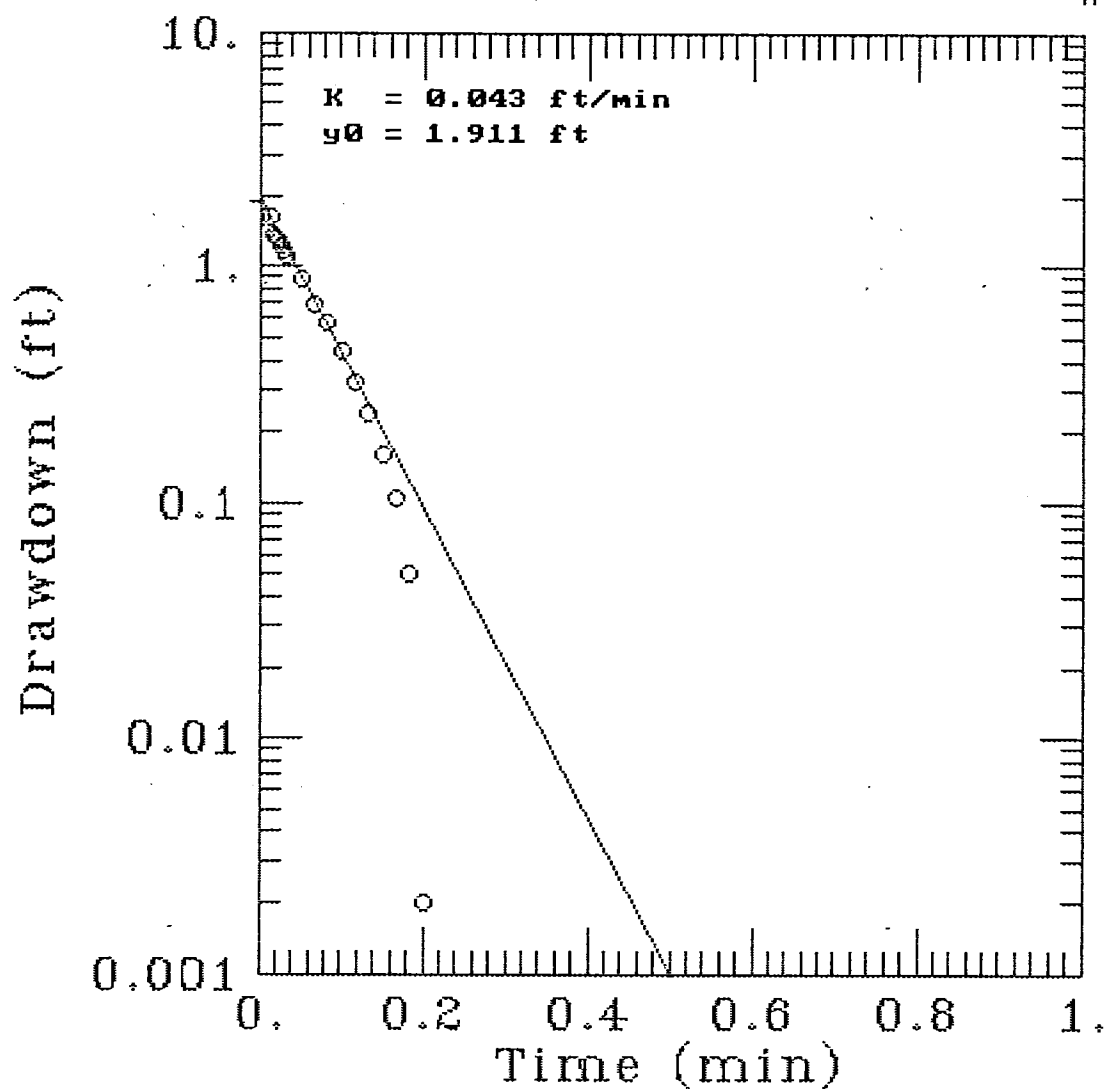
=====

TYPE CURVE DATA

K = 2.19008E-002
y0 = 5.97876E-001

Time	Drawdown	Time	Drawdown	Time	Drawdown
-----	-----	-----	-----	-----	-----
0.000E+000	5.979E-001	1.000E+000	2.794E-013		

PEN-3221NE-MW-12D RUN #1



AQTESOLV



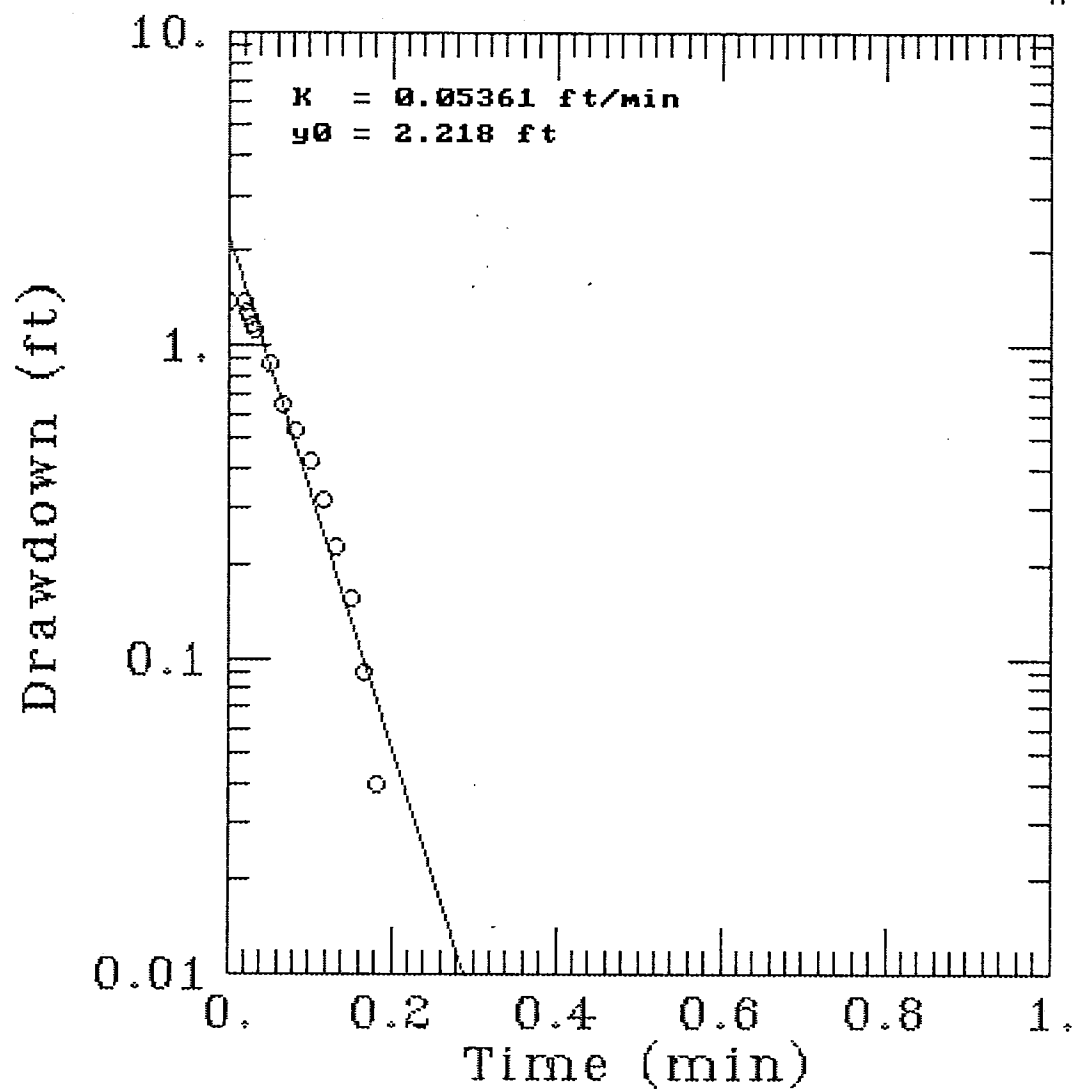
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Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	1.911E+000	1.000E+000	5.219E-007		

PEN-3221NE-MW-12D RUN #2



AQTESOLV



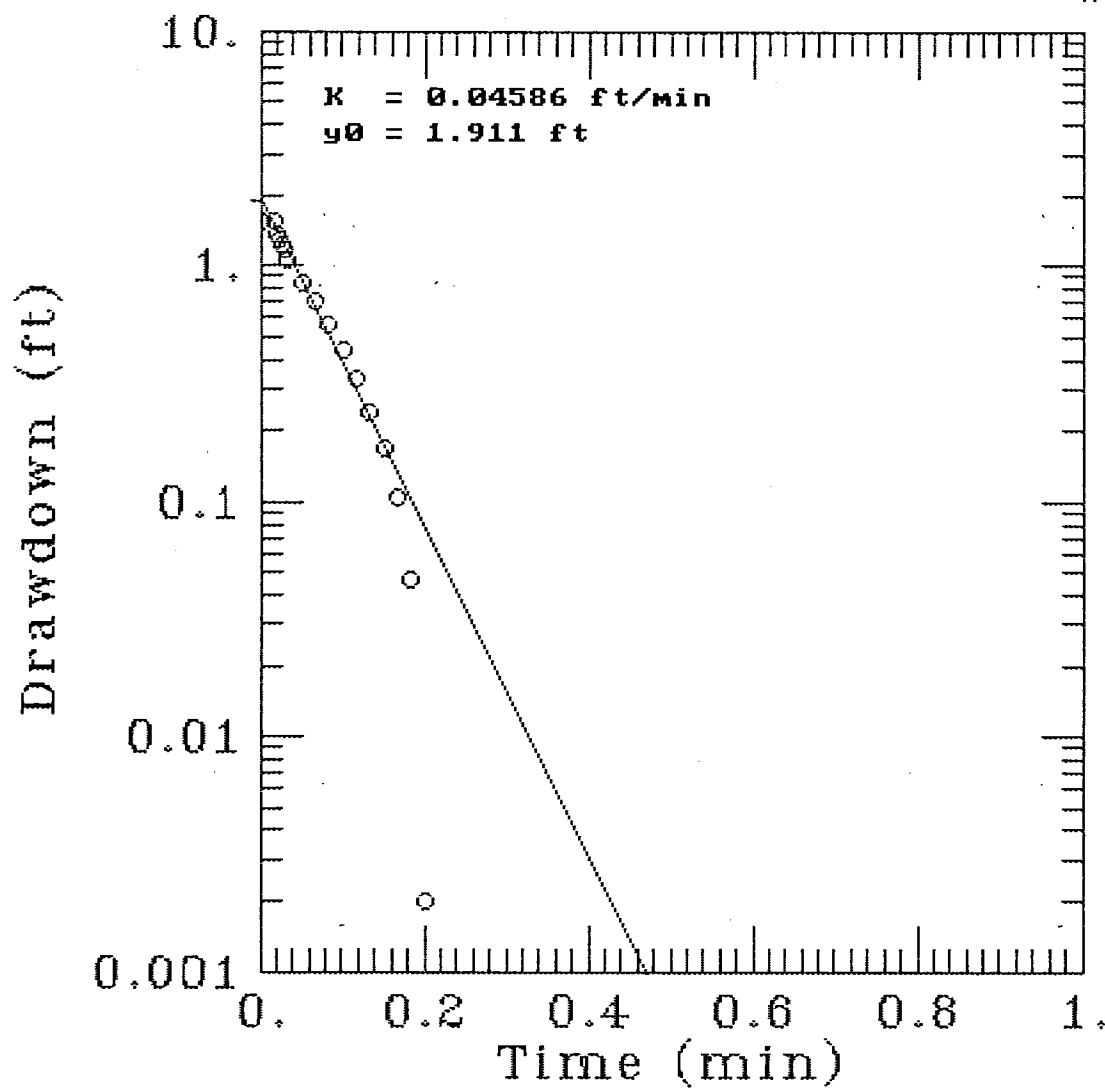
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Time	Drawdown	Time	Drawdown	Time	Drawdown
0.000E+000	2.218E+000	1.000E+000	1.452E-008		

PEN-3221NE-MW-12D RUN #3



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16:57:01

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Data set title..... PEN-3221NE-MW-12D RUN #3

Knowns and Constants:			
No. of data points.....	16		
Radius of well casing.....	0.083		
Radius of well.....	0.083		
Aquifer saturated thickness.....	25.25		
Well screen length.....	5		
Static height of water in well.....	25.25		
Log(Re/Rw).....	4.13		
A, B, C.....	0.000,	0.000,	2.998

11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 976 977 978 979 980 981 982 983 984 985 986 987 988 989 990 991 992 993 994 995 996 997 998 999 1000 1001 1002 1003 1004 1005 1006 1007 1008 1009 1010 1011 1012 1013 1014 1015 1016 1017 1018 1019 1020 1021 1022 1023 1024 1025 1026 1027 1028 1029 1030 1031 1032 1033 1034 1035 1036 1037 1038 1039 1040 1041 1042 1043 1044

Bouwer-Rice (Unconfined Aquifer Slug Test)

[illegible]

VISUAL MATCH PARAMETER ESTIMATES

```

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y0  =  0.0000E+000

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[illegible]

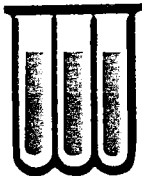
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K    = 4.58639E-002
y0  = 1.91095E+000
```

Time	Drawdown	Time	Drawdown	Time	Drawdown
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APPENDIX E
LABORATORY ANALYTICAL DATA

SOIL SAMPLE ANALYSES



WADSWORTH/ALERT
LABORATORIES

5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0014, MOD. NO. 0001

NAS/NADEP PENSACOLA - PHASE I

Presented to:

PETER REDFERN

ABB ENVIRONMENTAL SERVICES, INC.

WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FL 33610

(813) 621-0784

Dan Henson
Project Manager

Randall C. Grubbs
Laboratory Director - Florida

April 17, 1992



HEADQUARTERS AND
LABORATORY
P.O. Box 2912
4101 Shuffel Drive, N.W.
North Canton, OH 44720
(216) 497-9396

REGIONAL
LABORATORY
P.O. Box 31454
5405 Schaaf Rd.
Cleveland, OH 44131
(216) 642-9151

REGIONAL
OFFICE
1445 Pisgah Church Rd.
Lexington, SC 29072
(803) 957-8590

REGIONAL
LABORATORY
5910 Breckenridge Pkwy
Suite H
Tampa, FL 33610
(813) 621-0784

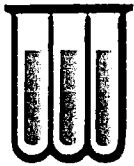


WADSWORTH/ALERT
LABORATORIES

INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola - Phase I site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Peter Redfern. The samples were accepted into Wadsworth's Florida facility on 02 April 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.



WADSWORTH/ALERT
LABORATORIES

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER	METHOD	

METALS		
Arsenic	** EPA Method 206.2	** SW846 Method 7060
Cadmium	** EPA Method 200.7	** SW846 Method 6010
Chromium	** EPA Method 200.7	** SW846 Method 6010
Lead	** EPA Method 239.2	** SW846 Method 6010
Digestion		** SW846 Method 3050

NOTE: ** Indicates usage of this method to obtain results for this report.

EPA Methods -Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982

Drinking Waters USEPA, 600/4-88/039, December, 1988.

Std. Methods -Standard Methods for the Examination of Water and Wastewater, APHA, 16th edition, 1985.

USEPA Methods -From 40CFR Part 136, published in Federal Register on October 26, 1984.

SW846 Methods -Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986.

ASTM Methods -American Society for Testing and Materials.

NIOSH Method -NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977.



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-1
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-1 (5')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 89%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/14/92	ND	0.5	mg/kg
Cadmium	4/14/92	ND	0.5	mg/kg
Chromium	4/14/92	ND	2.5	mg/kg
Lead	4/14/92	16	2.5	mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-2
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-2 (5.5')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 92%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/14/92	ND	0.5	mg/kg
Cadmium	4/14/92	ND	0.5	mg/kg
Chromium	4/14/92	ND	2.5	mg/kg
Lead	4/14/92	ND	2.5	mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-3
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-3 (5.5')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 90%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/14/92	ND	0.5	mg/kg
Cadmium	4/14/92	ND	0.5	mg/kg
Chromium	4/14/92	ND	2.5	mg/kg
Lead	4/14/92	ND	2.5	mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-4
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-4 (5')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 32%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/14/92	ND	0.5	mg/kg
Cadmium	4/14/92	ND	0.5	mg/kg
Chromium	4/14/92	ND	2.5	mg/kg
Lead	4/14/92	ND	2.5	mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-5
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-5 (6')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 75%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/14/92	ND	0.5	mg/kg
Cadmium	4/14/92	ND	0.5	mg/kg
Chromium	4/14/92	ND	2.5	mg/kg
Lead	4/14/92	ND	2.5	mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-6
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-6 (6')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 77%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/14/92	ND	0.5 mg/kg
Cadmium	4/14/92	ND	0.5 mg/kg
Chromium	4/14/92	ND	2.5 mg/kg
Lead	4/14/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-7
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-7 (4')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 87%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/14/92	ND	0.5 mg/kg
Cadmium	4/14/92	ND	0.5 mg/kg
Chromium	4/14/92	ND	2.5 mg/kg
Lead	4/14/92	3.9	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-8
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-8 (5')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 85%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/14/92	ND	0.5	mg/kg
Cadmium	4/14/92	ND	0.5	mg/kg
Chromium	4/14/92	ND	2.5	mg/kg
Lead	4/14/92	ND	2.5	mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-9
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-10 (6')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

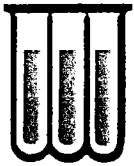
HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 87%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/14/92	ND	0.5 mg/kg
Cadmium	4/14/92	ND	0.5 mg/kg
Chromium	4/14/92	ND	2.5 mg/kg
Lead	4/14/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-10
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : MW-12D (7')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

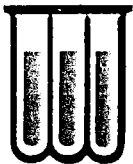
HRS84297

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 82%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/14/92	ND	0.5 mg/kg
Cadmium	4/14/92	ND	0.5 mg/kg
Chromium	4/14/92	ND	2.5 mg/kg
Lead	4/14/92	ND	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-11
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : DUPLICATE (5')

PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - dry weight basis

DRY WEIGHT (%): 74%

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/14/92	ND	0.5 mg/kg
Cadmium	4/14/92	ND	0.5 mg/kg
Chromium	4/14/92	4.6	2.5 mg/kg
Lead	4/14/92	25	2.5 mg/kg

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-13
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: DUPLICATE 1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	75	(17-95)	(24-118)
Phenol-d5	59	(11-89)	(17-124)
2,4,6-Tribromophenol	45	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-13
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : DUPLICATE 1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

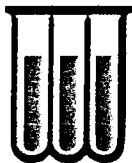
METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-13
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: DUPLICATE 1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB # : 2D0206-12
MATRIX : WATER

DATE RECEIVED: 4/ 2/92

SAMPLE ID : EQUIPMENT BLANK PROJ: NADEP PEN/3221 WE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/13/92	ND	10 ug/L
Cadmium	4/13/92	ND	10 ug/L
Chromium	4/13/92	ND	50 ug/L
Lead	4/13/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride
Toluene
2-Butanone
Acetone

Semi-volatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate

Metals

Calcium
Magnesium
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

*****EXAMPLE*****

COMPOUND	SAMPLE CONC.	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.	accep. method perform range	

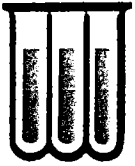
Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-BK
MATRIX : WATER

DATE RECEIVED: 4/ 2/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/13/92	ND	10	ug/L
Cadmium	4/13/92	ND	10	ug/L
Chromium	4/13/92	ND	50	ug/L
Lead	4/13/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D0206-BK
MATRIX : SOIL

DATE RECEIVED: 4/ 2/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

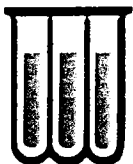
METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

DRY WEIGHT (%): D

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/14/92	ND	0.01 mg/L
Cadmium	4/14/92	ND	0.01 mg/L
Chromium	4/14/92	ND	0.05 mg/L
Lead	4/14/92	ND	0.05 mg/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

LAB #: 2D0206-LCS
MATRIX: SOIL

DATE RECEIVED: 04/02/92
DATE PREP'D: 04/14/92
DATE ANALYZED: 04/14/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Arsenic, furnace	94	51-124
Cadmium	86	67-113
Chromium	104	73-117
Lead	96	58-130

**WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

Client: ABB Project Name/Number: Nadep Pen / 3221 WE
Samples Received By: [Signature] / WAD Date Received: 4-2-92
(Signature)
Sample Evaluation Form By: [Signature] / WAD LAB No: 4197/200206-1 to 16
(Signature)

Type of shipping container samples received in? WAL Cooler ✓

Client Cooler WAL Shipper Box Other

Any "NO" responses or discrepancies should be explained in comments section.

- | | YES | NO |
|---|-----------|-------------|
| 1. Were custody seals on shipping container(s) intact? | <u>✓</u> | <u> </u> |
| 2. Were custody papers properly included with samples? | <u>✓</u> | <u> </u> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? | <u>✓</u> | <u> </u> |
| 4. Did all bottles arrive in good condition (unbroken)? | <u>✓</u> | <u> </u> |
| 5. Were all bottle labels complete
(Sample No., date, signed, analysis preservatives)? | <u>✓</u> | <u> </u> |
| 6. Were correct bottles used for the tests indicated? | <u>✓</u> | <u> </u> |
| 7. Were proper sample preservation techniques indicated? | <u>✓</u> | <u> </u> |
| 8. Were samples received within adequate holding time? | <u>✓</u> | <u> </u> |
| 9. Were all VOA bottles checked for the presence of air bubbles?
(If air bubbles were found indicate in comment section) | <u>NA</u> | <u> </u> |
| 10. Were samples in direct contact with wet ice?
(NOTE TEMPERATURE BELOW) | <u>✓</u> | <u> </u> |
| 11. Were samples accepted into the laboratory?
(If no see comments) | <u>✓</u> | <u> </u> |

Cooler # 1 Temp 2 °C Cooler # Temp °C
Cooler # Temp °C Cooler # Temp °C

Comments: _____

4197/2D0200-1-10

CHAIN OF CUSTODY RECORD

Page 1 of 1

PROJECT NO.		PROJECT NAME				NO. OF CONTAINERS	SAMPLE TYPE										REMARKS INDICATE SOIL/WATER/AIR SEDIMENT/SLUDGE		
SAMPLERS (SIGNATURE)		STA. NO.	DATE	TIME	COMP.		GRAB	STATION LOCATION	ASID GRAB										
Ryndel		5	3/30/92	1555		X	mw1	1											SOIL
		5	3/30/92	1555		X	Duplicate	1											"
		5	3/30/92	1610		X	mw 8	1											"
		5	3/30/92	1640		X	mw 4	1											"
		6	3/30/92	1650		X	mw 5	1											"
		5.5	3/30/92	1700		X	mw 3	1											"
		—	3/30/92	1720			EQUIP BLANK	1											WATER
		6	3/30/92	1730		X	mw 6	1											SOIL
		4	3/30/92	1730		X	mw 7	1											"
		6	3/30/92	1740		X	mw 10	1											"
		5.5	3/30/92	1745		X	mw 2	1											"
		7	3/30/92	1755		X	mw 12 D												"
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)		RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)									
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)		RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED BY: (SIGNATURE)									
RELINQUISHED BY: (SIGNATURE)		DATE/TIME		RECEIVED FOR DISPOSAL BY: (SIGNATURE)		DATE/TIME		REMARKS											

ABB Environmental Services, Inc.

GROUNDWATER SAMPLE ANALYSES



WADSWORTH/ALERT
LABORATORIES

5910 Breckenridge Pkwy., Suite H, Tampa, FL 33610

Sampling, testing, mobile labs

Since 1938

ANALYTICAL REPORT

SUBCONTRACT NUMBER: 1-08-134

TASK ORDER NUMBER: 0015

NAS/NADEP PENSACOLA - PHASE II

Presented to:

PETER REDFERN

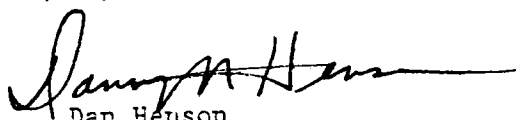
ABB ENVIRONMENTAL SERVICES, INC.

WADSWORTH/ALERT LABORATORIES

5910 BRECKENRIDGE PARKWAY, SUITE H

TAMPA, FL 33610

(813) 621-0784


Dan Henson
Project Manager

Randall C. Grubbs
Laboratory Director - Florida

March 24, 1992



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Lexington, SC 29072
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REGIONAL
LABORATORY
5910 Breckenridge Pkwy
Suite H
Tampa, FL 33610
(813) 621-0784



WADSWORTH/ALERT
LABORATORIES

INVOLVEMENT

This report summarizes the analytical results of the NAS/NADEP Pensacola - Phase II site submitted by ABB Environmental Services, Inc. to Wadsworth/ALERT Laboratories who provided independent, analytical services for this project under the direction of Peter Redfern. The samples were accepted into Wadsworth's Florida facility on 28 February 1992, in accordance with documented sample acceptance procedures. The associated analytical methods and sample results are outlined sequentially in this report.

Analytical results included in this report have been reviewed for compliance with the Laboratory QA/QC Plan as summarized in the Quality Control Section at the rear of the report. Sample custody documentation describing the number of samples and sample matrices is also included. Any qualifications and/or non-compliant items have been noted below.

Laboratory ID #

2B2805-6,9,11,15,16

Narrative

These samples were analyzed for volatile organic compounds after the EPA recommended holding time had expired.



WADSWORTH/ALERT
LABORATORIES

ANALYTICAL METHODS

Wadsworth/ALERT Laboratories utilizes only USEPA approved analytical methods and instrumentation. The analytical methods utilized for the analysis of these samples are listed below.

PARAMETER	METHOD

ORGANICS	
Volatile Organics	** EPA Method 624
Base/Neutral Acid Extractables	** EPA Method 625
METALS	
Arsenic	** EPA Method 206.2
Cadmium	** EPA Method 200.7
Chromium	** EPA Method 200.7
Lead	** EPA Method 239.2
MISCELLANEOUS	
Tot. Rec. Petroleum Hydrocarbons	** EPA Method 418.1

NOTE: ** Indicates usage of this method to obtain results for this report.

- | | |
|---------------|--|
| EPA Methods | -Methods for Chemical Analysis of Water and Wastes, USEPA, 600/4-79-020, March, 1983. July, 1982
Drinking Waters USEPA, 600/4-88/039, December, 1988. |
| Std. Methods | -Standard Methods for the Examination of Water and Waste-water, APHA, 16th edition, 1985. |
| USEPA Methods | -From 40CFR Part 136, published in Federal Register on October 26, 1984. |
| SW846 Methods | -Test Methods for Evaluating Solid Waste Physical/Chemical Methods, 3rd Edition, USEPA, 1986. |
| ASTM Methods | -American Society for Testing and Materials. |
| NIOSH Method | -NIOSH Manual of Analytical Methods, National Institute for Occupational Safety and Health, 2nd Edition, April 1977. |



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-1
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	96	(75-123)	(85-126)	(85-138)
Toluene-d8	102	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	93	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-1
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
OTHER COMPOUNDS

Acetone

79 ug/L

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-1
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS

HRS84297

USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-1
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

BASE/NEUTRAL EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	37	(22-135)	(10-155)
Fluorobiphenyl	30	(34-140)	(12-153)
Terphenyl-d14	16	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-1
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	22	(17-95)	(24-118)
Phenol-d5	15	(11-89)	(17-124)
2,4,6-Tribromophenol	10	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-1
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	3/11/92	ND	10 ug/L
Cadmium	3/11/92	ND	10 ug/L
Chromium	3/11/92	ND	50 ug/L
Lead	3/11- 3/12/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

LAB #: 2D0206-LCS
MATRIX: WATER

DATE RECEIVED: 04/02/92
DATE PREP'D: 04/13/92
DATE ANALYZED: 04/13/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Arsenic, furnace	86	54-130
Cadmium	100	78-113
Chromium	109	79-121
Lead, furnace	91	64-131



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-1
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-2
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	8
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	98	(75-123)	(85-126)	(85-138)
Toluene-d8	103	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	109	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-2
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-2

PROJ: NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
OTHER COMPOUNDS

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

Methyl(1-methylethyl)-benzene	8 ug/L
2,4-Dimethylphenyl	9 ug/L
1,4-Dimethyl-2-(1-methylethyl)-benzene	5 ug/L
Unknown substituted benzene	9 ug/L
1,2,4,5-Tetramethyl-benzene	4 ug/L
Unknown substituted benzene	12 ug/L
1-Methyl-4-(1-methylethyl)-benzene	10 ug/L
1-Methyl-2-(1-methylethyl)-benzene	5 ug/L
(1) Unknown	8 ug/L
1-(1,1-Dimethylethyl)-4-methyl-benzene	4 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-2
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-2
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	92	(22-135)	(10-155)
Fluorobiphenyl	80	(34-140)	(12-153)
Terphenyl-d14	55	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-2
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-2

PROJ:NADEP PEN/3221NE

EXTRACTABLE ORGANICS
OTHER COMPOUNDS

CERTIFICATION #: E84059
HRS84297

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

2,6-Dimethyl-undecane	8 ug/L
2,3,6-Trimethyl-octane	10 ug/L
9-Octyl-heptadecane	5 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-2
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	84	(17-95)	(24-118)
Phenol-d5	77	(11-89)	(17-124)
2,4,6-Tribromophenol	106	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-2
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-2
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	4	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-3
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-3

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	7
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	99	(75-123)	(85-126)	(85-138)
Toluene-d8	104	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	93	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-3
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-3

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-3
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-3

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	82	(22-135)	(10-155)
Fluorobiphenyl	79	(34-140)	(12-153)
Terphenyl-d14	88	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-3
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-3

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	84	(17-95)	(24-118)
Phenol-d5	78	(11-89)	(17-124)
2,4,6-Tribromophenol	89	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-3
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-3

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	3/11/92	ND	10 ug/L
Cadmium	3/11/92	ND	10 ug/L
Chromium	3/11/92	ND	50 ug/L
Lead	3/11- 3/12/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-3
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-3

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-4
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-4

PROJ: NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	7
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	97	(75-123)	(85-126)	(85-138)
Toluene-d8	102	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	94	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-4
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-4

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS

HR84297

USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-4
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-4

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	67	(22-135)	(10-155)
Fluorobiphenyl	88	(84-140)	(12-158)
Terphenyl-d14	32	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-4
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-4

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	78	(17-95)	(24-118)
Phenol-d5	77	(11-89)	(17-124)
2,4,6-Tribromophenol	59	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-4
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-4

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-4
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-4

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-13
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: DUPLICATE 1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	39
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	84	(75-123)	(85-126)	(85-138)
Toluene-d8	102	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	89	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-13
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: DUPLICATE 1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS

HRS84297

USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Ben-zidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-13
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: DUPLICATE 1

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (2 of 2)

HRS84297

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	59	(22-135)	(10-155)
Fluorobiphenyl	68	(34-140)	(12-153)
Terphenyl-d14	39	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-5
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-5

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	8
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOIL	LOW LEVEL
1,2-Dichloroethane	98	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	94	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-5
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-5

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Ben-zidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-5
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-5

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	68	(22-135)	(10-155)
Fluorobiphenyl	72	(24-140)	(12-152)
Terphenyl-d14	57	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-5
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-5

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	47	(17-95)	(24-118)
Phenol-d5	57	(11-89)	(17-124)
2,4,6-Tribromophenol	36	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-5
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-5

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	3/11/92	ND	10 ug/L
Cadmium	3/11/92	ND	10 ug/L
Chromium	3/11/92	ND	50 ug/L
Lead	3/11- 3/12/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-5
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-5

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-7
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/20/92

SAMPLE ID: 3221NE-MW6

NADEP PEN

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	3
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	89	(75-123)	(85-126)	(85-138)
Toluene-d8	100	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	98	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-6
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-6

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-6
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-6

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	58	(22-135)	(10-155)
Fluorobiphenyl	75	(34-140)	(12-153)
Terphenyl-d14	29	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-6
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-6

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

HRS84297

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	76	(17-95)	(24-118)
Phenol-d5	69	(11-89)	(17-124)
2,4,6-Tribromophenol	45	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-6
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-6

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-6
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-6

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-7
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-7

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	96	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	94	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-7
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-7

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297
BASE/NEUTRAL -- EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Ben-zidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-7
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-7

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	32	(22-135)	(10-155)
Fluorobiphenyl	45	(34-140)	(12-153)
Terphenyl-d14	21	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-7
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-7

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	38	(17-95)	(24-118)
Phenol-d5	33	(11-89)	(17-124)
2,4,6-Tribromophenol	28	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-7
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-7

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-7
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-7

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-8
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	97	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	91	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-8
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
OTHER COMPOUNDS

Acetone

53 ug/L

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-8
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-8
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	30	(22-135)	(10-155)
Fluorobiphenyl	31	(34-140)	(12-133)
Terphenyl-d14	18	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-8
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

EXTRACTABLE ORGANICS
OTHER COMPOUNDS

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

(3) Unknown(s)

59 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-8
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	39	(17-95)	(24-118)
Phenol-d5	29	(11-89)	(17-124)
2,4,6-Tribromophenol	15	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-8
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	3/11/92	ND	10 ug/L
Cadmium	3/11/92	ND	10 ug/L
Chromium	3/11/92	ND	50 ug/L
Lead	3/11- 3/12/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-8
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-8

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-14
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: DUPLICATE 2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	25
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	91	(75-123)	(85-126)	(85-138)
Toluene-d8	100	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	94	(96-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-14
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: DUPLICATE 2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (1 of 2)

HRS84297

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Ben-zidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-14
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: DUPLICATE 2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (2 of 2)

HRS84297

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	40	(22-135)	(10-155)
Fluorobiphenyl	33	(34-140)	(12-153)
Terphenyl-d14	15	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-14
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: DUPLICATE 2

PROJ:NADEP PEN/3221NE

EXTRACTABLE ORGANICS
OTHER COMPOUNDS

CERTIFICATION #: E84059
HRS84297

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

5-Methyl-undecane
3-Methyl-undecane

11 ug/L
18 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-14
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: DUPLICATE 2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	67	(17-95)	(24-118)
Phenol-d5	39	(11-89)	(17-124)
2,4,6-Tribromophenol	16	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-14
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : DUPLICATE 2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT

HRS84297

SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-14
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: DUPLICATE 2

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	1	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-8
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/21/92

SAMPLE ID: 3221NE-MW9

NADEP PEN

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	90	(75-123)	(85-126)	(85-138)
Toluene-d8	102	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	91	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-8
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/21/92

SAMPLE ID: 3221NE-MW9

NADEP PEN

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
OTHER COMPOUNDS

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

1,2-Dichloro-1,1,2-triflouro ethane

3 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-9
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-9

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-9
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-9

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	61	(22-135)	(10-155)
Fluorobiphenyl	73	(34-140)	(12-153)
Terphenyl-d14	46	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-9
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-9

PROJ:NADEP PEN/3221NE

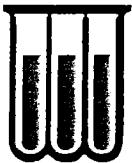
CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	71	(17-95)	(24-118)
Phenol-d5	52	(11-89)	(17-124)
2,4,6-Tribromophenol	67	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-9
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-9

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	3/11/92	ND	10 ug/L
Cadmium	3/11/92	ND	10 ug/L
Chromium	3/11/92	ND	50 ug/L
Lead	3/11- 3/12/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-9
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-9

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-10
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	3
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	40
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	1
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	5
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	30
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	97	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	97	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-10
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
OTHER COMPOUNDS

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

1,3-Dimethyl-benzene	200 ug/L
Propyl benzene	10 ug/L
1-Ethyl-2-methyl-benzene	60 ug/L
1-Ethyl-4-methyl benzene	42 ug/L
1,2,3-Trimethyl-benzene	110 ug/L
(1-Methylethyl)-benzene	36 ug/L
1-Methyl-3-propyl benzene	12 ug/L
1-Methyl-3-(1-methylethyl)-benzene	15 ug/L
1-Methyl-2-(1-methylethyl)-benzene	13 ug/L
1-Ethyl-3-methyl-benzene	18 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-10
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-10
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	13
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	81	(22-135)	(10-155)
Fluorobiphenyl	84	(34-140)	(12-153)
Terphenyl-d14	90	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-10
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

EXTRACTABLE ORGANICS
OTHER COMPOUNDS

1-Methylnaphthalene	7 ug/L
2-Methylnaphthalene	6 ug/L

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

1,3-Dimethyl-benzene	25 ug/L
1-Ethyl-4-methyl-benzene	26 ug/L
1,3,5-Trimethyl-benzene	19 ug/L
1-Ethyl-3-methyl-benzene	8 ug/L
1,2,4-Trimethyl-benzene	39 ug/L
1-Ethyl-3,5-dimethyl-benzene	6 ug/L
1,2,4,5-Tetramethyl-benzene	10 ug/L
1-Ethyl-2,4-dimethyl-benzene	8 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-10
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	86	(17-95)	(24-118)
Phenol-d5	72	(11-89)	(17-124)
2,4,6-Tribromophenol	76	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-10
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	3/11/92	ND	10 ug/L
Cadmium	3/11/92	ND	10 ug/L
Chromium	3/11/92	ND	50 ug/L
Lead	3/11- 3/12/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-10
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-10

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-9
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/21/92

SAMPLE ID: 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	44
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	92
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 3 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 30 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	98	(75-123)	(85-126)	(85-138)
Toluene-d8	103	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	96	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-9
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/21/92

SAMPLE ID: 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
OTHER COMPOUNDS

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

· (1-Methylethyl) benzene	11 ug/L
· Propyl benzene	11 ug/L
· 1-Ethyl-2-methyl benzene	44 ug/L
· 1,3,5-Trimethyl benzene	29 ug/L
· 1-Ethyl-3-methyl benzene	89 ug/L
· 1-Ethyl-4-methyl benzene	23 ug/L
· 4-Methyl benzoic acid-2-oxo-2-phenylethyl ester	13 ug/L
· 1-Methyl-3-(1-methylethyl) benzene	15 ug/L
· Substituted benzene	12 ug/L
· 1-Methyl-2-(1-methylethyl) benzene	9 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D2302-1
MATRIX: WATER

DATE RECEIVED: 4/23/92
DATE EXTRACTED: 4/23/92
DATE ANALYZED: 4/29/92

SAMPLE ID: 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
HRS84297

BASE/NEUTRAL -- EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D2302-1
MATRIX: WATER

DATE RECEIVED: 4/23/92
DATE EXTRACTED: 4/23/92
DATE ANALYZED: 4/29/92

SAMPLE ID: 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	16
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	94	(22-135)	(10-155)
Fluorobiphenyl	79	(34-140)	(12-153)
Terphenyl-d14	72	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D2302-1
MATRIX: WATER

DATE RECEIVED: 4/23/92
DATE EXTRACTED: 4/23/92
DATE ANALYZED: 4/29/92

SAMPLE ID: 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
HRS84297

EXTRACTABLE ORGANICS
OTHER COMPOUNDS

1-Methyl naphthalene	7 ug/L
2-Methyl naphthalene	6 ug/L

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

· Ethyl benzene	27 ug/L
· Benzene, 1,2-dimethyl	57 ug/L
· Benzene, 1-ethyl-4-methyl	32 ug/L
· Benzene, 1,2,4-trimethyl	21 ug/L
· Benzene, 1,2,3-trimethyl	29 ug/L
· Benzene, 4-ethyl-1,2-dimethyl	12 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D2302-1
MATRIX: WATER

DATE RECEIVED: 4/23/92
DATE EXTRACTED: 4/23/92
DATE ANALYZED: 4/29/92

SAMPLE ID: 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND
2-Methyl-4,6-dinitrophenol	ND
2-Nitrophenol	ND
4-Nitrophenol	ND
Pentachlorophenol	ND
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	92	(17-95)	(24-118)
Phenol-d5	83	(11-89)	(17-124)
2,4,6-Tribromophenol	108	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-9
MATRIX : WATER

DATE RECEIVED: 4/16/92

SAMPLE ID : 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
HRS84297

**METALS ANALYTICAL REPORT
SELECTED LIST**

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT
Arsenic	4/28/92	ND	10 ug/L
Cadmium	4/28/92	ND	10 ug/L
Chromium	4/28/92	ND	50 ug/L
Lead	4/28/92	ND	5 ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2D1601-9
MATRIX : WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: 4/30/92
DATE ANALYZED: 5/ 1/92

SAMPLE ID: 3221NE-MW10 NADEP PEN

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-10
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/21/92

SAMPLE ID: 3221NE-MW11 NADEP PEN

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	4
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	96	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	97	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-10
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/21/92

SAMPLE ID: 3221NE-MW11 NADEP PEN

VOLATILE ORGANICS
OTHER COMPOUNDS

CERTIFICATION #: E84059
HRS84297

MASS SPECTROMETER/DATA SYSTEM (MSDS) TENTATIVELY IDENTIFIED COMPOUNDS
with their estimated concentrations

1,2,-Dichloro-1,1,2-triflouro ethane	23 ug/L
2,3,4-Trimethyl pentane	1 ug/L
3,3-Dimethyl hexane	4 ug/L
(1,1-Dimethylethyl) benzene	2 ug/L
1,2-Diethyl benzene	4 ug/L
2,3-Dihydro-1-methyl-1H-indene	1 ug/L
2-Butenyl benzene	2 ug/L
2,3-Dihydro-1,1-dimethyl-1H-indene	4 ug/L
(1-Methyl-1-propenyl) benzene	2 ug/L
1,2,3,4-Tetrahydro-1,4-methoronaphthalene-9-ol	1 ug/L



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-11
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-11

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Ben-zidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-11
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-11

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL EXTRACTABLE ORGANICS

HRS84297

USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	80	(22-135)	(10-155)
Fluorobiphenyl	85	(34-140)	(12-153)
Terphenyl-d14	70	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-11
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-11

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	75	(17-95)	(24-118)
Phenol-d5	59	(11-89)	(17-124)
2,4,6-Tribromophenol	80	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-11
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-11

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-11
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-11

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-12
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: MW-12D

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	28
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	89	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	97	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-12
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

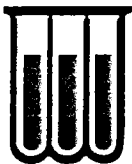
SAMPLE ID: MW-12D

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-12
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-12D

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (2 of 2)

HRS84297

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	71	(22-135)	(10-155)
Fluorobiphenyl	80	(34-140)	(12-153)
Terphenyl-d14	86	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-12
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: MW-12D

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	57	(17-95)	(24-118)
Phenol-d5	45	(11-89)	(17-124)
2,4,6-Tribromophenol	31	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-12
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : MW-12D

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-12
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: MW-12D

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-15
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/23/92

SAMPLE ID: EQUIPMENT BLANK

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	79	(75-123)	(85-126)	(85-138)
Toluene-d8	102	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	88	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-15
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: EQUIPMENT BLANK

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

BASE/NEUTRAL -- EXTRACTABLE ORGANICS

HRS84297

USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-15
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: EQUIPMENT BLANK

PROJ:NADEP PEN/3221NE.

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	74	(22-135)	(10-155)
Fluorobiphenyl	86	(34-140)	(12-153)
Terphenyl-d14	97	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-15
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/11/92

SAMPLE ID: EQUIPMENT BLANK

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	80	(17-95)	(24-118)
Phenol-d5	65	(11-89)	(17-124)
2,4,6-Tribromophenol	55	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-15
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : EQUIPMENT BLANK

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059

METALS ANALYTICAL REPORT
SELECTED LIST

HRS84297

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-15
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: EQUIPMENT BLANK

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-16
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/22/92

SAMPLE ID: TRIP BLANK

PROJ:NADEP PEN/3221NE

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	87	(75-123)	(85-126)	(85-138)
Toluene-d8	100	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	92	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-13
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/18/92

SAMPLE ID: TRIP BLANK NADEP PEN

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	91	(75-123)	(85-126)	(85-138)
Toluene-d8	99	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	92	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride
Toluene
2-Butanone
Acetone

Semi-volatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate

Metals

Calcium
Magnesium
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

*****EXAMPLE*****

COMPOUND	SAMPLE CONC.	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150

(cmpd. name)	sample	1st%	2nd%	Rel.%	accep. method
	result	recov.	recov.	diff.	perform range

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/11/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	97	(75-123)	(85-126)	(85-138)
Toluene-d8	102	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	95	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/12/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	99	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	93	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/20/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	3
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	96	(75-123)	(85-126)	(85-138)
Toluene-d8	100	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	92	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/21/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	87	(75-123)	(85-126)	(85-138)
Toluene-d8	101	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	91	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 3/23/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	99	(75-123)	(85-126)	(85-138)
Toluene-d8	94	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	94	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
BASE/NEUTRAL -- EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Benzidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
BASE/NEUTRAL EXTRACTABLE ORGANICS HRS84297
USEPA METHOD 625 - GC/MS (2 of 2)

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	72	(22-135)	(10-155)
Fluorobiphenyl	75	(34-140)	(12-153)
Terphenyl-d14	84	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX: WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/ 2/92
DATE ANALYZED: 3/10/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	83	(17-95)	(24-118)
Phenol-d5	74	(11-89)	(17-124)
2,4,6-Tribromophenol	105	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2B2805-BK
MATRIX : WATER

DATE RECEIVED: 2/28/92

SAMPLE ID : LABORATORY BLANK

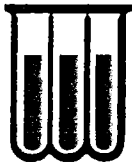
CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	3/11/92	ND	10	ug/L
Cadmium	3/11/92	ND	10	ug/L
Chromium	3/11/92	ND	50	ug/L
Lead	3/11- 3/12/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2B2805-BK
MATRIX : WATER

DATE RECEIVED: 2/28/92
DATE EXTRACTED: 3/10/92
DATE ANALYZED: 3/10/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : W2124

DATE EXTRACTED: N/A
DATE ANALYZED : 03/11/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
1,1-Dichloroethene	W2124	57	40	56-133
Trichloroethene		92	20	67-106
Chlorobenzene		95	21	78-122
Toluene		100	30	64-128
Benzene		90	21	83-123
Dichlorobromomethane		92	25	71-123



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : W2146

DATE EXTRACTED: N/A
DATE ANALYZED : 03/12/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
1,1-Dichloroethene	W2146	56	40	56-133
Trichloroethene		89	20	67-106
Chlorobenzene		92	21	78-122
Toluene		99	30	64-128
Benzene		88	21	83-123
Dichlorobromomethane		97	25	71-123



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : W2294

DATE EXTRACTED: N/A
DATE ANALYZED : 03/20/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
1,1-Dichloroethene	W2294	69	40 56-133
Trichloroethene		95	20 67-106
Chlorobenzene		96	21 78-122
Toluene		111	30 64-128
Benzene		105	21 83-123
Dichlorobromomethane		83	25 71-123



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : W2312

DATE EXTRACTED: N/A
DATE ANALYZED : 03/21/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	QC LIMITS	
		%REC	RPD	%REC

1,1-Dichloroethene	W2312	71	40	56-133
Trichloroethene		99	20	67-106
Chlorobenzene		100	21	78-122
Toluene		114	30	64-128
Benzene		110	21	83-123
Dichlorobromomethane		108	25	71-123



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : W2329

DATE EXTRACTED: N/A
DATE ANALYZED : 03/23/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	QC LIMITS	
		%REC	RPD	%REC
1,1-Dichloroethene	W2329	68	40	56-133
Trichloroethene		105	20	67-106
Chlorobenzene		102	21	78-122
Toluene		117	30	64-128
Benzene		109	21	83-123
Dichlorobromomethane		103	25	71-123



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B2805-LCS
MATRIX: WATER
METHOD: 625

DATE RECEIVED: 02/28/92
DATE EXTRACTED: 03/02/92
DATE ANALYZED: 03/10/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
1,2,4-Trichlorobenzene	96	20-111
Acenaphthene	83	31-105
2,4-Dinitrotoluene	79	22-107
Pyrene	86	12-108
Nitrosodipropylamine	81	42-125
1,4-Dichlorobenzene	71	31-99



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B2805-LCS
MATRIX: WATER
METHOD: 625

DATE RECEIVED: 02/28/92
DATE EXTRACTED: 03/02/92
DATE ANALYZED: 03/10/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Pentachlorophenol	21	10-100
Phenol	74	12-90
2-Chlorophenol	81	30-100
4-Chloro-o-cresol	78	12-109
4-Nitrophenol	42	10-102



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B2805-LCS
MATRIX: WATER

DATE RECEIVED: 02/28/92
DATE PREP'D: 03/11/92
DATE ANALYZED: 03/11/92 to
03/12/92

LABORATORY CHECK SAMPLE RECOVERY

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Arsenic, furnace	103	54-130
Cadmium	89	78-113
Chromium	95	79-121
Lead, furnace	97	64-131



WADSWORTH/ALERT
LABORATORIES

LAB #: 2B2805-LCS
MATRIX: WATER

DATE RECEIVED: 02/28/92
DATE EXTRACTED: 03/10/92
DATE ANALYZED: 03/10/92

LABORATORY CHECK SAMPLE

COMPOUND	LCS %REC	QC LIMITS RECOVERY
Tot. Rec. Pet. Hydrocarbons	99	75-124



WADSWORTH/ALERT
LABORATORIES

LAB#: 2B2805-5
MATRIX: WATER
METHOD: 624

DATE RECEIVED: 02/28/92
DATE EXTRACTED: NA
DATE ANALYZED: 03/21/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS	MSD	RPD	QC LIMITS	
	%REC	%REC		RPD	RECOVERY
1,1-Dichloroethene	78	74	5	19	63-123
Trichloroethene	96	99	3	10	75-115
Chlorobenzene	96	94	2	13	74-113
Toluene	117	112	4	23	75-122
Benzene	107	105	2	16	76-126
Dichlorobromomethane	100	102	2	15	67-114



WADSWORTH/ALERT
LABORATORIES

LAB#: 2B2805-4
MATRIX: WATER
METHOD: 625

DATE RECEIVED: 02/28/92
DATE EXTRACTED: 03/02/92
DATE ANALYZED: 03/10/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS %REC	MSD %REC	RPD	QC LIMITS RPD RECOVERY	
1,2,4-Trichlorobenzene	81	71	13	15	27-65
Acenaphthene	77	76	1	25	57-104
2,4-Dinitrotoluene	39	32	20	22	22-81
Pyrene	80	75	6	30	58-148
Nitrosodipropylamine	72	65	10	29	40-127
1,4-Dichlorobenzene	61	54	12	20	16-56



WADSWORTH/ALERT
LABORATORIES

LAB#: 2B2805-4
MATRIX: WATER
METHOD: 625

DATE RECEIVED: 02/28/92
DATE EXTRACTED: 03/02/92
DATE ANALYZED: 03/11/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	MS	MSD	RPD	QC LIMITS	
	%REC	%REC		RPD	RECOVERY
Pentachlorophenol	36	32	12	42	13-96
Phenol	71	63	11	23	15-97
2-Chlorophenol	77	71	8	21	17-89
4-Chloro-o-cresol	70	64	9	36	8-101
4-Nitrophenol	36	31	15	34	13-99



WADSWORTH/ALERT
LABORATORIES

LAB#: 2B2805-6
MATRIX: WATER

DATE RECEIVED: 02/28/92
DATE PREP'D: 03/11/92
DATE ANALYZED: 03/11/92 to
03/12/92

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY
INORGANIC PARAMETERS - METALS

ELEMENT	MS	MSD	RPD	QC LIMITS	
	%REC	%REC		RPD	RECOVERY
Arsenic, furnace	95	96	1	19	80-119
Cadmium	90	88	2	15	76-110
Chromium	89	93	4	21	74-117
Lead, furnace	94	95	1	24	76-124

**WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

Client: ABB Project Name/Number: 3221 N.E.

Samples Received By: W. J. Martin Jr. Date Received: 2/28/92
(Signature)

Sample Evaluation Form By: W. J. Martin Jr. LAB No: 3980/282805-1 to 19
(Signature)

Type of shipping container samples received in? WAL Cooler ✓

Client Cooler WAL Shipper Box Other

Any "NO" responses or discrepancies should be explained in comments section.

- | | YES | NO |
|---|----------|-------------|
| 1. Were custody seals on shipping container(s) intact? | <u>✓</u> | <u> </u> |
| 2. Were custody papers properly included with samples? | <u>✓</u> | <u> </u> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? | <u>✓</u> | <u> </u> |
| 4. Did all bottles arrive in good condition (unbroken)? | <u>✓</u> | <u> </u> |
| 5. Were all bottle labels complete
(Sample No., date, signed, analysis preservatives)? | <u>✓</u> | <u> </u> |
| 6. Were correct bottles used for the tests indicated? | <u>✓</u> | <u> </u> |
| 7. Were proper sample preservation techniques indicated? | <u>✓</u> | <u> </u> |
| 8. Were samples received within adequate holding time? | <u>✓</u> | <u> </u> |
| 9. Were all VOA bottles checked for the presence of air bubbles?
(If air bubbles were found indicate in comment section) | <u>✓</u> | <u> </u> |
| 10. Were samples in direct contact with wet ice?
(NOTE TEMPERATURE BELOW) | <u>✓</u> | <u> </u> |
| 11. Were samples accepted into the laboratory?
(If no see comments) | <u>✓</u> | <u> </u> |

Cooler # 1108 Temp 8 °C Cooler # 171 Temp 10 °C
Cooler # Temp °C Cooler # Temp °C

Comments: _____

282805-1 to 19
3980

WADSWORTH/ALERT LABORATORIES - FLORIDA

5910-H BRECKENRIDGE PARKWAY/TAMPA, FL 33610
(813) 621-0784

No 5341

Chain-of Custody Record

PROJ. NO.		PROJECT NAME/LOCATION					NO. OF CONTAINERS	PARAMETER						REMARKS
SAMPLERS: (Signature)								BNA	624	TRDPH	AS161618			
STA. NO.	DATE	TIME	COMP.	GRAB.	STATION LOCATION									
	2/27/92	14:10		X	mw 1		6	2	2	1	1			Metals bottle is only 2/3 full
		15:10		X	mw 2		6	2	2	1	1			
		10:30		X	mw 3		6	2	2	1	1			
		09:57		X	mw 4		6	2	2	1	1			
		10:20		X	mw 5		6	2	2	1	1			
		10:45		X	mw 6		6	2	2	1	1			
		11:00		X	mw 7		6	2	2	1	1			
		11:40		X	mw 8		6	2	2	1	1			
		11:30		X	mw 9		6	2	2	1	1			
		14:00		X	mw 10		6	2	2	1	1			
		11:15		X	mw 11		6	2	2	1	1			
		14:50		X	mw 12D		6	2	2	1	1			
		14:20		X	EQUP BLANK		6	2	2	1	1			
		10:03		X	DUP 1		6	2	2	1	1			
		11:45		X	DUP 2		6	2	1	1	1			
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)				
Aaron Cohen		2/27/92 17:15		Fed EX										
Relinquished by: (Signature)		Date / Time		Received by: (Signature)		Relinquished by: (Signature)		Date / Time		Received by: (Signature)				
		2-28-92 15:00		[Signature]										
Relinquished by: (Signature)		Date / Time		Received for Laboratory by: (Signature)		Date / Time		Remarks						

Distribution Original Accompanies Shipment. Copy returned with Report.



WADSWORTH/ALERT
LABORATORIES

QUALITY CONTROL SECTION

- Quality Control Summary
- Laboratory Blanks
- Laboratory Control Sample
- Matrix Spike/Matrix Spike Duplicate Results
- Sample Custody Documentation



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY

Wadsworth/ALERT Laboratories considers continuous analytical method performance evaluations to be an integral portion of the data package, and routinely includes the pertinent QA/QC data associated with various analytical result reports. Brief discussions of the various QA/QC procedures utilized to measure acceptable method and matrix performance follow.

Surrogate Spike Recovery Evaluations

Known concentrations of designated surrogate spikes, consisting of a number of similar, non-method compounds or method compound analogues, are added, as appropriate, to routine GC and GC/MS sample fractions prior to extraction and analysis. The percent recovery determinations calculated from the subsequent analysis is an indication of the overall method efficiency for the individual sample. This surrogate spike recovery data is displayed alongside acceptable analytical method performance limits at the bottom of each applicable analytical result report sheet.

NOTE: Acceptable method performance for Base/Neutral Acid extractables is indicated by two (2) of three (3) surrogates for each fraction with a minimum recovery of ten (10) percent each. For Pesticides one (1) of two (2) surrogates meeting performance criteria is acceptable.

Laboratory Analytical Method Blank Evaluations

Laboratory analytical method blanks are systematically prepared and analyzed in order to continuously evaluate the system interferences and background contamination levels associated with each analytical method. These method blanks include all aspects of actual laboratory method analysis (chemical reagents, glassware, etc.), substituting laboratory reagent water or solid for actual sample. The method blank must not contain any analytes above the reported detection limit. The following common laboratory contaminants are exceptions to this rule provided they are not present at greater than five times the detection limit.

Volatiles

Methylene chloride
Toluene
2-Butanone
Acetone

Semi-volatiles

Dimethyl phthalate
Diethyl phthalate
Di-n-butyl phthalate
Butyl benzyl phthalate
Bis (2-ethylhexyl) phthalate

Metals

Calcium
Magnesium
Sodium

A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method blanks.

Laboratory Analytical Method Check Sample Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to a laboratory reagent blank prior to extraction and analysis. Percent recovery determinations demonstrate the performance of the analytical method. Failure of a check sample to meet established laboratory recovery criteria is cause to stop the analysis until the problem is resolved.



WADSWORTH/ALERT
LABORATORIES

QUALITY ASSURANCE / QUALITY CONTROL
PROGRAM SUMMARY
(cont'd)

At that time all associated samples must be re-analyzed. A minimum of five percent (5%) of all laboratory analyses are laboratory analytical method check samples.

Matrix Spike (MS)/Matrix Spike Duplicate (MSD) Recovery Evaluations

Known concentrations of designated matrix spikes (actual analytical method compounds) are added to two of three separate aliquots of a sequentially predetermined sample prior to extraction and analysis. Percent recovery determinations are calculated from both of the spiked samples by comparison to the actual values generated from the unspiked sample. These percent recovery determinations indicate the accuracy of the analysis at recovering actual analytical method compounds from the matrix. Relative percent difference determinations calculated from a comparison of the MS/MSD recoveries demonstrate the precision of the analytical method. Actual percent recovery and relative percent difference data is displayed alongside their respective acceptable analytical method performance limits in the QA/QC section of the report. The MS/MSD are considered in control when the precision is within established control limits and the associated check sample has been found to be acceptable. A minimum of ten percent (10%) of all analyses are MS/MSD quality control samples.

*****EXAMPLE*****

COMPOUND	SAMPLE CONC.	MS %REC	MSD %REC	RPD	QC LIMITS	
					RPD	RECOVERY
4,4'-DDT	0	95	112	16	22	66-119
Benzene	10	86	93	8	20	39-150
(cmpd. name)	sample result	1st% recov.	2nd% recov.	Rel.% diff.	accep. method perform range	

Analytical Result Qualifiers

The following qualifiers, as defined below, may be appended to analytical results in order to allow proper interpretation of the results presented:

J - indicates an estimated concentration (typically used when a dilution, matrix interference or instrumental limitation prevents accurate quantitation of a particular analyte).

B - indicates the presence of a particular analyte in the laboratory blank analyzed concurrently with the samples. Results must be interpreted accordingly.

DIL - indicates that because of matrix interferences and/or high analyte concentrations, it was necessary to dilute the sample to a point where the surrogate or spike concentrations fell below a quantifiable amount and could not be reported.



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-BK
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/17/92

SAMPLE ID: LABORATORY BLANK

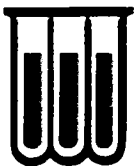
CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	ND
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	81	(75-123)	(85-126)	(85-138)
Toluene-d8	99	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	91	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-BK
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: NA
DATE ANALYZED: 4/20/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

VOLATILE ORGANICS
USEPA METHOD 624 - GC/MS

Acrolein	ND*	1,1-Dichloroethene	ND
Acrylonitrile	ND*	1,2-Dichloroethene(Total)	ND
Benzene	ND	1,2-Dichloropropane	ND
Bromodichloromethane	ND	cis-1,3-Dichloropropene	ND
Bromoform	ND	trans-1,3-Dichloropropene	ND
Bromomethane	ND	Ethylbenzene	ND
Carbon tetrachloride	ND	Methylene chloride	1
Chlorobenzene	ND	1,1,2,2-Tetrachloroethane	ND
Chloroethane	ND	Tetrachloroethene	ND
2-Chloroethylvinyl ether	ND	Toluene	ND
Chloroform	ND	1,1,1-Trichloroethane	ND
Chloromethane	ND	1,1,2-Trichloroethane	ND
Dibromochloromethane	ND	Trichloroethene	ND
1,2-Dichlorobenzene	ND	Trichlorofluoromethane	ND
1,3-Dichlorobenzene	ND	Vinyl chloride	ND
1,4-Dichlorobenzene	ND	Xylene(Total)	ND
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		

NOTE: ND (None Detected, lower detectable limit = 1 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND** (None Detected, lower detectable limit = ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS		
		WATER	SOLID	LOW LEVEL
1,2-Dichloroethane	96	(75-123)	(85-126)	(85-138)
Toluene-d8	100	(75-123)	(89-124)	(89-128)
Bromofluorobenzene	96	(86-115)	(84-124)	(83-128)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-BK
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: 4/16/92
DATE ANALYZED: 4/24/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297
BASE/NEUTRAL -- EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (1 of 2)

Acenaphthene	ND	Dibenzo(a,h)anthracene	ND
Acenaphthylene	ND	Di-n-butyl phthalate	ND
Anthracene	ND	1,2-Dichlorobenzene	ND
Ben-zidine	ND*	1,3-Dichlorobenzene	ND
Benzo(a)anthracene	ND	1,4-Dichlorobenzene	ND
Benzo(b)fluoranthene	ND	3,3'-Dichlorobenzidine	ND*
Benzo(k)fluoranthene	ND	Diethyl phthalate	ND
Benzo(ghi)perylene	ND	Dimethyl phthalate	ND
Benzo(a)pyrene	ND	2,4-Dinitrotoluene	ND
Bis(2-Chloroethoxy)methane	ND	2,6-Dinitrotoluene	ND
Bis(2-Chloroethyl)ether	ND	Di-n-octyl phthalate	ND
Bis(2-Chloroisopropyl)ether	ND	Fluoranthene	ND
Bis(2-Ethylhexyl)phthalate	ND	Fluorene	ND
4-Bromophenyl phenyl ether	ND	Hexachlorobenzene	ND
Butyl benzyl phthalate	ND	Hexachlorobutadiene	ND
2-Chloronaphthalene	ND	Hexachlorocyclopentadiene	ND
4-Chlorophenyl phenyl ether	ND	Hexachloroethane	ND
Chrysene	ND	Indeno(1,2,3-cd)pyrene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-BK
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: 4/16/92
DATE ANALYZED: 4/24/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059

BASE/NEUTRAL EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS (2 of 2)

HRS84297

Isophorone	ND
Naphthalene	ND
Nitrobenzene	ND
N-Nitrosodimethylamine	ND
N-Nitrosodiphenylamine	ND
N-Nitrosodi-n-propylamine	ND
Phenanthrene	ND
Pyrene	ND
1,2,4-Trichlorobenzene	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit: estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
Nitrobenzene-d5	59	(22-135)	(10-155)
Fluorobiphenyl	63	(34-140)	(12-153)
Terphenyl-d14	69	(10-132)	(13-140)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-BK
MATRIX: WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: 4/16/92
DATE ANALYZED: 4/24/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

ACID EXTRACTABLE ORGANICS
USEPA METHOD 625 - GC/MS

4-Chloro-3-methylphenol	ND
2-Chlorophenol	ND
2,4-Dichlorophenol	ND
2,4-Dimethylphenol	ND
2,4-Dinitrophenol	ND*
2-Methyl-4,6-dinitrophenol	ND*
2-Nitrophenol	ND
4-Nitrophenol	ND*
Pentachlorophenol	ND*
Phenol	ND
2,4,6-Trichlorophenol	ND

NOTE: ND (None Detected, lower detectable limit = 10 ug/L) as rec'd
ND* (None Detected, lower detectable limit = 50 ug/L) as rec'd
J (Detected, but below quantitation limit; estimated value)
B (Compound detected in method blank associated with this sample)
-- (Not Analyzed)

SURROGATE RECOVERY:	%	ACCEPTABLE LIMITS	
		WATER	SOLID
2-Fluorophenol	47	(17-95)	(24-118)
Phenol-d5	45	(11-89)	(17-124)
2,4,6-Tribromophenol	54	(10-134)	(10-156)



WADSWORTH/ALERT
LABORATORIES

COMPANY : ABB ENVIRONMENTAL SERVICES, INC.
LAB #: 2D1601-BK
MATRIX : WATER

DATE RECEIVED: 4/16/92

SAMPLE ID : LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

METALS ANALYTICAL REPORT
SELECTED LIST

Total metals analysis results - as received

ELEMENT	PREPARATION - ANALYSIS DATE	RESULT	DETECTION LIMIT	
Arsenic	4/28/92	ND	10	ug/L
Cadmium	4/28/92	ND	10	ug/L
Chromium	4/28/92	ND	50	ug/L
Lead	4/28/92	ND	5	ug/L

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

COMPANY: ABB ENVIRONMENTAL SERVICES, INC.
LAB ID: 2D1601-BK
MATRIX : WATER

DATE RECEIVED: 4/16/92
DATE EXTRACTED: 4/30/92
DATE ANALYZED: 5/ 1/92

SAMPLE ID: LABORATORY BLANK

CERTIFICATION #: E84059
HRS84297

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS REPORT

	RESULT	UNITS	LOWER DETECTION LIMIT
Total Recoverable Petroleum Hydrocarbons	ND	mg/L	1

NOTE: ND (None Detected)



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : W2522

DATE EXTRACTED: N/A
DATE ANALYZED : 04/17/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	QC LIMITS	
		%REC	RPD	%REC
1,1-Dichloroethene	W2522	105	40	56-133
Trichloroethene		89	20	67-106
Chlorobenzene		89	21	78-122
Toluene		96	30	64-128
Benzene		94	21	83-123
Dichlorobromomethane		88	25	71-123



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 624
RUN ID : W2545

DATE EXTRACTED: N/A
DATE ANALYZED : 04/20/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS	QC LIMITS	
		%REC	RPD	%REC
1,1-Dichloroethene	W2545	100	40	56-133
Trichloroethene		88	20	67-106
Chlorobenzene		84	21	78-122
Toluene		98	30	64-128
Benzene		94	21	83-123
Dichlorobromomethane		90	25	71-123



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 625
RUN ID : S9333

DATE EXTRACTED: 04/16/92
DATE ANALYZED : 04/24/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS RPD %REC
1,4-Dichlorobenzene	S9333	46	30 31-99
N-Nitrosodi-n-propylamine		48	41 42-125
1,2,4 Trichlorobenzene		59	43 20-111
Acenaphthene		60	36 31-105
2,4-Dinitrotoluene		37	40 22-107
Pyrene		62	32 12-108



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS
MATRIX : WATER
METHOD : 625
RUN ID : S9333

DATE EXTRACTED: 04/16/92
DATE ANALYZED : 04/24/92

LABORATORY CONTROL SAMPLE RESULTS

COMPOUND	ANALYTICAL RUN ID #	LCS %REC	QC LIMITS	
			RPD	%REC
Phenol	S9333	27	37	12-90
2-Chlorophenol		41	33	30-100
4-Chloro-3-methylphenol		44	32	12-109
4-Nitrophenol		26	42	10-102
Pentachlorophenol		58	42	10-100



WADSWORTH/ALERT
LABORATORIES

LAB ID : 2D1601-6
MATRIX : WATER
METHOD : 625
RUN ID : S9340/S9341

DATE RECEIVED : 04/16/92
DATE PREPARED : 04/16/92
DATE ANALYZED : 04/24/92

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS	MSD	QC LIMITS		
		%REC	%REC	RPD	RPD	%REC
Phenol	S9340/S9341	30	37	21	23	15-97
2-Chlorophenol		37	38	3	21	17-89
4-Chloro-3-methylphenol		48	52	8	36	08-101
4-Nitrophenol		54	58	7	34	13-99
4-Nitrophenol		54	58	7	34	13-99
Pentachlorophenol		33	44	29	42	13-96

* - Diluted Out



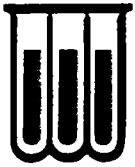
WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS

MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS
METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD %REC	
Arsenic (furnace)	04/28/92	04/28/92	88	38 53-131	LCS
Cadmium	04/28/92	04/28/92	97	18 77-113	
Chromium	04/28/92	04/28/92	112	21 79-121	
Lead (furnace)	04/28/92	04/28/92	99	33 64-132	



WADSWORTH/ALERT
LABORATORIES

LAB ID : LCS

MATRIX : WATER

LABORATORY CONTROL SAMPLE RESULTS
METALS

ELEMENT	DATE PREPARED	DATE ANALYZED	LCS %REC	QC LIMITS RPD %REC	
TRPH (IR)	04/30/92	05/01/92	100	24 75-124	LCS



WADSWORTH/ALERT
LABORATORIES

LAB ID : 2D1601-1
MATRIX : WATER
METHOD : 624
RUN ID : W2559/W2560

DATE RECEIVED : 04/16/92
DATE PREPARED : N/A
DATE ANALYZED : 04/21/92

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS	MSD	RPD	QC LIMITS	
		%REC	%REC		RPD	%REC
1,1-Dichloroethene	W2559/W2560	102	102	0	19	63-123
Trichloroethene		88	90	2	10	75-115
Chlorobenzene		88	86	2	13	74-113
Toluene		99	99	0	23	75-122
Benzene		96	96	0	16	76-126
Dichlorobromomethane		86	88	2	15	67-114

* - Diluted Out



WADSWORTH/ALERT
LABORATORIES

LAB ID : 2D1601-6
MATRIX : WATER
METHOD : 625
RUN ID : S9340/S9341

DATE RECEIVED : 04/16/92
DATE PREPARED : 04/16/92
DATE ANALYZED : 04/24/92

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY

COMPOUND	ANALYTICAL RUN ID #	MS %REC	MSD %REC	RPD	QC LIMITS RPD %REC
1,4-Dichlorobenzene	S9340/S9341	47	46	2	20 16-56
N-Nitrosodi-n-propylamine		57	57	0	29 40-127
1,2,4 Trichlorobenzene		65	61	6	15 27-65
Acenaphthene		60	58	3	24 57-104
2,4-Dinitrotoluene		67	65	3	22 22-81
Pyrene		81	83	2	30 58-148

* - Diluted Out

**WADSWORTH/ALERT LABORATORIES
SAMPLE SHIPPER EVALUATION AND RECEIPT FORM**

Client: ABB Project Name/Number: NADER Plan
 Samples Received By: Carel McNulty Date Received: 4/16/92
 (Signature)
 Sample Evaluation Form By: Carel McNulty LAB No: 42651201601-1613
 (Signature)

Type of shipping container samples received in? WAL Cooler X
 Client Cooler WAL Shipper Box Other

Any "NO" responses or discrepancies should be explained in comments section.

- | | YES | NO |
|---|-------------|-------------|
| 1. Were custody seals on shipping container(s) intact? | <u>X</u> | <u> </u> |
| 2. Were custody papers properly included with samples? | <u>X</u> | <u> </u> |
| 3. Were custody papers properly filled out (ink, signed, match labels)? | <u>X</u> | <u> </u> |
| 4. Did all bottles arrive in good condition (unbroken)? | <u> </u> | <u>X</u> |
| 5. Were all bottle labels complete (Sample No., date, signed, analysis preservatives)? | <u>X</u> | <u> </u> |
| 6. Were correct bottles used for the tests indicated? | <u>X</u> | <u> </u> |
| 7. Were proper sample preservation techniques indicated? | <u>X</u> | <u> </u> |
| 8. Were samples received within adequate holding time? | <u>X</u> | <u> </u> |
| 9. Were all VOA bottles checked for the presence of air bubbles?
(If air bubbles were found indicate in comment section) | <u>X</u> | <u> </u> |
| 10. Were samples in direct contact with wet ice?
(NOTE TEMPERATURE BELOW) | <u>X</u> | <u> </u> |
| 11. Were samples accepted into the laboratory?
(If no see comments) | <u>X</u> | <u> </u> |

Cooler # 110 Temp 6 °C Cooler # 187 Temp 5 °C
 Cooler # 47 Temp 6 °C Cooler # Temp °C

Comments (3221-^{NE} MW10- BNA bottle broken when rec'd) both atty listed!
Coc not filled out as to what parameters (VOC, PAH, Metals, TRPH)
Bottle labels have these parameters - 624, BNA, TRPH, AS, Cd, CR, P.



WADSWORTH/ALERT
LABORATORIES
Sampling, testing, mobile labs

5910 Breckenridge Pkwy.
Suite H
Tampa, FL 33610

(813) 621-0784
Fax (813) 623-6021

Record _____ of _____

05634

Client:		Project Name / Location NADEP PFW			No. Of CONTAINERS	Parameter										Remarks		
Sampler(s) Large dials		Project #:				VOC -	PAH -	METALS -	TRPH -	EDB -								
Item #	Date	Time	MATRIX	Sample Location														
124	4/15/92	1015	WATER	3221 SW - EQUIP BLANK	6	2	2	1	1									
112	4/15/92	1035	WATER	315 SW - MW 2	6	2	2	1	1									
133	4/15/92	1135	WATER	3221 SW - MW 3	6	2	2	1	1									
124	4/15/92	1147	WATER	3221 SW - MW 2	6	2	2	1	1									
113	4/15/92	1200	WATER	3221 SW - MW 1	6	2	2	1	1									
116	4/15/92	1210	WATER	3221 SW - DUPLICATE	6	2	2	1	1									
115	4/15/92	1220	WATER	3221 SW - MW 5	6	2	2	1	1									
118	4/15/92	1230	WATER	3221 SW MW 4	6	2	2	1	1									
119	4/15/92	1517	WATER	3221 NE - MW 10	6	2	2	1	1									both bottles for RNA acid broken
1110	4/15/92	1505	WATER	3221 NE - MW 6	2	2												
1111	4/15/92	1025	WATER	TRIP BLANK	2	2												

Total Containers

58

Number of Coolers in Shipment

3

Bailers

Report To:

Transfer Number

Item Number(s)

Relinquished By / Company

Accepted By / Company

Date

Time

Additional Comments:

1

2

3

4

5

6

Rogers 1715
4/15/92

Wadsworth/Alert
Carol McNulty
4/16/92

10:15

Original Accompanies Shipment